Crude Investments

A Multilevel Analysis of Political Risk and Foreign Direct Investments within the Petroleum Industry

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It is claimed that the Chinese general Sun Tzu once said: you should keep your friends close, but your enemies closer. Well, although writing this thesis, at times, has felt like a battle, this campaign would never have succeeded without the contributions and the support of my beloved friends. So, with all due respect, General. I beg to differ!

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While no man can win a war on his own, as commander in charge of this campaign, the responsibility for any faults committed are entirely mine to bear.

Jo Menzony Appelqvist Bakken

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1 Introduction

Among the many challenges facing multinational petroleum companies making investments abroad, there has been an increased focus on the many pitfalls originating from the political and social environment of host countries. In 2005, for example, the Venezuelan government, under the lead of President Hugo Chavez, passed a resolution, which increased income taxes from four heavy-oil projects from 36% to 50%. Being an integrated part of a strategy aimed at securing national control over the country's substantial petroleum resources, the resolution is assumed to have had direct impact on the operations of multinational petroleum companies such as Exxon Mobil, Chevron, BP and Statoil. In Africa, foreign operations in the largest oil exporting country, Nigeria, have long been plagued by kidnappings and sabotage against employees and production facilities. Usually portrayed as a result of poverty and ethnical unrest in the region surrounding the delta of river Niger, this has, among other things, forced Shell to start budgeting with "protection money" to local big men and bribery money to corrupt Nigerian courts (Jakobsen 2007: 8).

As the abovementioned examples clearly illustrate, making investments abroad does mean that multinational petroleum companies are becoming exposed to political risk, which if materialised, could lead to reduced cash flows or lost property. However, as political risk is not merely a question about impact, but also a matter of likelihood, a high degree of perceived political risk may also undermine upstream foreign direct investments (FDI) through yet another channel. Caused by the perceived necessity of preventive and sometimes costly measures, such as the hiring of security specialists, strategies for establishing local content, and the signing of expensive political risk insurances, multinational petroleum companies may at the end conclude that the potential payoffs are outweighed by the costs of protecting themselves against future dangers that may harm their businesses. Potentially leading to inefficient use of petroleum resources and reduced supply caused by underinvestment in upstream ventures, in a market characterised by increasing demand and strong competition over access to the world's oil and gas fields, finding ways to effectively handle and mitigate political risk should therefore be a main concern to CEOs and governments around the globe.

1.1 Research question

Following a line of research, which can be traced back to the late 1950s, scholars, such as Stephen Kobrin, Stefan H. Robock, Raymond Vernon and John H. Dunning have made valuable contributions to improve our understanding of how host country politics affect inward FDI. Initially being oriented towards identification and classification of risk factors, the so-called "catalogue approach", the research then moved towards more focus on political risk as being embedded within the process of modernization: the so-called System-Event School or Robock´s Process School (Jarvis 2008: 19-76). Despite being unable to explain the causal relationship between political risk and investments, these approaches did pave way for a third generation of research, which through scenarios and expert surveys, sought to give "informative appraisals of the risk environment in relation to industry or project specific applications" (ibid.: 43).

Building on the abovementioned research, this thesis approaches the proposed relationship between political risk and FDI by placing multinational petroleum companies and their investment allocation decisions at the centre of attention. There are three reasons for choosing this approach. First, as petroleum companies are responsible for bringing petroleum resources from the ground to the gas stations and manufactories, their ability to mitigate political risk is critical for the functioning of world production. Second, there are theories that suggest that political risk is particularly persistent within the petroleum industry, as these are resources of high strategic importance and low factor mobility. Third and finally, instead of only focusing on political risk factors, on which an individual company may have limited influence, it might be more fruitful to consider the influence of political risk as a result of interactions between political risk sources and the properties that decide a companies' risk mitigation capacity. Based on these assumptions I have formulated the following research question:

How does multinational petroleum companies´ ability to handle political risk influence the geographical allocation of upstream foreign direct investment?

To address the research question, which is illustrated in figure 1.1, I will apply the OLI framework as the theoretical point of departure (Dunning 1980). Aimed at explaining what determine the scope, geographical distribution and composition of FDI, the OLI framework identifies three types of advantage. First, there are ownership specific advantages (from here O-specific advantages), which seek to explain how a company's competitive advantage may

galvanise, and in this case, determine the scope and allocation of FDI. Second, as the magnitude and allocation FDI also depend on host countries characteristics, locational advantages, or in this case, disadvantages are also important to explain why companies expand their business across borders. Finally, there are internalisation advantages, which offer explanations for why companies may find it more profitable to subsume parts of, or the whole production chain under the formal command of the company.

Figure 1.1 Political risk, O-specific advantages and upstream FDI

While all being important determinants of FDI, in the following analyses, O-specific advantages will be given most attention, as these are considered to be most critical in determining the risk mitigation capacity of multinational petroleum companies. Further, representing an eclectic framework about the determinants of FDI, the OLI framework does not offer specific suggestions about how political risk affects the allocation of FDI and how O-specific advantages can contribute in mitigating these risks. Thus, it is necessary to complement the OLI framework with theories that are more specific in their claims about how political risk is generated and how political risk influences the investment climate. As the number of potential sources of political risk greatly exceeds the practical boundaries of this thesis, I have chosen to concentrate on the effects of 1) the political regime, 2) political instability, 3) human development, 4) regulatory quality, and 5) the control of corruption. To explain why and how these country characteristics arise as sources of political risk this thesis deploys a wide range of theories, from which the working hypotheses are subsequently formulated.

In the attempt to answer the research question, this thesis applies a quantitative approach, in which the method of choice is logistic multilevel regression modelling. The reason for choosing this method is that it allows for regression analyses of structured data, of which the assumption of independent observations is violated. Furthermore, as the focal point in the upcoming analyses is to test if interactions between political risk and O-specific advantages

offer statistically valid explanations of the geographical allocation of upstream FDI within the petroleum industry, cross-level interaction terms are included in the analysis. As will be debated more thoroughly below, this has some important implications for how the results are interpreted.

1.2 Political risk and corporate finance

When deciding where to allocate foreign direct investments, multinational petroleum companies, with limited resources are, according to Osmundsen *et al.* (2006a: 105) predominately concerned with the materiality of the investment project. As multinational petroleum companies incur fixed area costs when entering into a country or area, the materiality, which is "a function of the expected after tax cash flows and the discount rate", is required to be of a certain size to be interesting to multinational petroleum companies (ibid.: 106). Political risk may influence the materiality through at least four channels. First, as political risk increases uncertainty over future returns, to justify the expenditures associated with exploration and production, multinational petroleum companies will increase demands of future returns when upstream investments projects are compared with alternative capital allocations, such as other destinations, stocks and bank deposits. In other words, political risk should lead multinational petroleum companies to discount future returns more heavily. Second, if already present in a country, political risk could, if materialised, lead to disrupted cash flows and lost equity shares through politically motived actions such as terrorism, sabotage and hostile government policies. Clearly reducing the cash flow from the investment, this may lead companies to withdraw from the country.

Third, besides being concerned with future cash flows, company costs are also affecting the materiality of an investment project. Defined by Osmundsen *et al.* (2006a: 118) as costs, "which are usually not included in calculations of the anticipated cash flow", these costs are critical when companies make decisions of whether to invest in a country or not. From this then it seems obvious that a high degree of perceived political risk would lower the prospects of entry, as necessary, but often costly measures, such as the signing of political risk insurances and strategies of corporate social responsibility (CSR), would decrease the materiality. Finally, political risk is not only influencing the geographical allocation of upstream FDI through increased costs and higher discount rates. Investigating how kidnapping and crime affect companies, Pshisva and Suarez (2006: 23-28) argue that

companies also confront financial constraints when wanting to invest in host countries, in which the perceived degree of political risk is high. The reason for this is that banks and shareholders, in fear of ending up losing their invested money, may be more reluctant to make the necessary capital available to managers wanting to expand the business into new territories. From this, and the elements mentioned above, it should therefore be quite clear that political risk may seriously damages the financial viability of an investment project.

2 Theoretical framework

In this chapter the theoretical framework, from which the hypotheses are derived, is presented. The chapter has two sections. In section one, FDI is first conceptualised before the motives and the determinants behind FDI are presented and debated in some detail. Finally, the risk mitigation capacity of multinational petroleum companies is debated, in which the focus is on how company size and state ownership may render some companies more likely to be able to handle political risk than others. Having debated FDI, section two begins with a definition and delimitation of political risk. From here the chapter proceeds with a presentation and discussion of the sources of political risk, in which the hypotheses are also presented.

2.1 Foreign direct investments

2.1.1 Definition and delimitations

FDI can be described as a certain type of investment strategy, by which profit-maximising companies, that are expanding their businesses across national borders, are substituting market exchanges for long-term ownership control within the formal boundaries of the company. Separating FDI from other kinds of investment strategies, such as short-term portfolio investments, one of the key elements in the abovementioned definition is, that in order to be considered a FDI, companies must obtain some formal ownership (equity share) in a foreign investment project. According to OECD standards, this equity share is ten per cent (OECD 1999: 8). Although arbitrary and somewhat controversial, this goalpost will be the standard, by which FDI are separated from portfolio investments. This means that joint ventures, which have become ever more present in the petroleum industry, may be considered a FDI, if for any given company, their equity share in exploration and production projects exceeds ten per cent. Similarly, any foreign investor that establishes a foreign subsidiary, or otherwise is directly, or indirectly, holding equities in a foreign entity will be considered a foreign direct investor, given that the equity share exceeds the ten per cent limit. Finally, following common standards when defining upstream investments I include both exploration and production. Since exploration does not necessary mean that any formal equity is being obtained, the ten per cent rule may be violated in cases where upstream investments only take

the form of explorations. However, according to OECD standards, under certain circumstances, even transactions can be regarded as FDI. As it turns out, among these transactions are expenditures involved in exploration activities (ibid.: 22).

2.1.2 Motives behind FDI

According to Dunning and Lundan (2008: 67-74) there are basically four types of motives, or types of companies, which can explain the foreign activities of multinational companies. The first type of companies, are those that are motivated by need to acquire natural resources at a lower cost than in their home countries (ibid.: 68). Being further divided into three sub types, these natural resource seekers are assumed to either be seeking physical resources, skilled workers or technology, and knowledge. As these resources are unequally distributed between, and of unequal importance to multinational petroleum companies, there are good reasons to believe that they are all present as motivations for FDI within the international petroleum industry. The second type of companies, are those that are motivated by the access to foreign markets. While perhaps of secondary concern to companies preoccupied with upstream investments, market seekers are assumed to invest for such purposes as to circumvent import restrictions, adapt products to local markets and to improve their market position (ibid.: 70). The third type of motive that may encourage companies to go abroad is closely connected to the integration processes, as companies may find that the production chain can be more efficient if subsumed to common governance. Usually succeeding the other motivations in time, efficiency seekers are frequently found doing host country shopping and the persecution of scale economics. Finally, there are companies that are motivated by long-term strategic considerations. Aimed at improving competitiveness, these strategic asset seekers are trying to gain market control through measures like mergers, takeovers and alliance building (ibid.: 72-73). Mostly proactive in nature, these strategies may, however, also be motivated by a wish to harm existing competitors and to prohibit the market entry of new competitors.

2.1.3 Determinants of FDI: the eclectic OLI paradigm

Dismantling the black box of the multinational company, Dunning's eclectic OLI paradigm provides a comprehensive analytical framework, from which more specific inferences about the determinants of FDI may be derived. Building on theories, such as the product cycle theory of Vernon, Hymer's industrial organisation theory, and the internalisation theories of

Buckley and Casson, the OLI paradigm identifies three types of advantages, or sub paradigms, which together, offer some suggestions about why, where and how multinational companies conduct their international business activity (Dunning and Lundan 2008).

The first type of advantages, which are highlighted in the OLI framework, is O-specific advantages (O). As the name suggests, O-specific advantages refer to assets that a company possesses and which provide the company with a competitive advantage in competition with foreign and domestic companies. Following Dunning and Lundan (2008: 100-106), assets can be classified as being either tangible or intangible. While tangible are physical assets, such as machinery, capital, and, in the case of petroleum companies, reserves, intangible assets includes non-physical endowments such as non-replicable technology, an experienced management and reputation. O-specific advantages can, furthermore, be provided externally or they can be generated by the company itself (ibid.: 120). While examples of the former are state ownership and access to educated personnel, development of state of the art technology and a competent management are examples of O-specific advantages that originate from inside the boundaries of the company.

Given the configuration of the O-specific and I-specific advantages, locational advantages (L) offer explanations for why some countries are regarded as more attractive destinations to FDI than others. Traditionally explained by the factors that determine a country's comparative advantage, such as the presence and accessibility of natural resources, the size and closeness of markets, and opportunities to enhance operation efficiency, today, L-specific advantages are also considered to include political factors, such as government stability, corruption levels, and fiscal and regulatory regimes (Oatley 2008: 177). Since focusing on FDI in the petroleum industry, reserves that can be profitably exploited are also imperative sources of L-specific advantages. This is, to some degree, a question of geology, with larger fields being preferred to smaller fields, and onshore fields being preferred to offshore fields. Furthermore, as upstream investments demand large amounts of intermediate goods, such as steel, stable and secure supply of these goods is usually deemed to be critical.

The third and final type of advantage is that of internalisation advantages (I). Caused by the failure of markets to efficiently mitigate transactions between companies involved in the production chain, multinational petroleum companies may find, that instead of relying on market transactions when buying and selling intermediate goods, their O-specific advantages are better exploited by subsuming the whole, or parts of, the production chain under the

formal authority of the company (Dunning and Lundan 2008: 100). The process, which is often referred to as vertical integration, is of particular interest to scholars studying multinational companies, as transaction costs are typically higher in international markets, than in domestic markets (Oatley 2008: 181-182). With regard to the petroleum industry, I-specific advantages are first and foremost a question about secure supply of crude oil and natural gas. By integrating upstream and downstream multinational petroleum companies are thus, to a certain degree, able to protect themselves against the frequently volatile prices that characterise the petroleum market.

2.1.4 O-specific advantages and political risk mitigation

Despite the importance and interdependency of the three types of advantages, as mentioned earlier, I consider O-specific advantages to be of primary importance when assessments about the risk mitigation capacity of multinational petroleum companies are made. Based in this, O-specific advantages will be the main focus of the remaining discussion.

Having presented the main tenets of the OLI framework, the next step is to identify O-specific advantages and thereafter to explain how these advantages can influence multinational petroleum companies' willingness to be exposed to, and the ability to mitigate political risk. The first type of O-specific advantages to be considered here is company size. Although not an advantage, per se, and, at times, even risk enhancing, larger petroleum companies should have better risk mitigation capacity than their smaller counterparts due to the some of the following reasons:

Access to capital and scale economics: Larger petroleum companies usually have more capital at disposal than smaller companies. First of all, as the magnitude of their operations may give rise to scale economics, larger companies tend to have higher returns. Furthermore, due to their geographical diversification, larger multinational petroleum companies can harvest from tax planning, with profits being reallocated to countries where taxation policies are most favourable (Osmundsen 2006b: 18). Large capital reserves also give the opportunity to sustain short-term losses without having to abandon production. Finally, as larger petroleum companies are usually objects to larger stakeholders than smaller petroleum companies, larger petroleum companies are likely to privilege from better access to political risk insurance (PRI), which although both expensive and with limited coverage, may prove a

valuable supplement to other risk handling strategies, such as diversification (Hamdani *et al.* 2005).

Political support: Due to their relatively larger stocks of employees and their ability to generate tax revenues, politicians may have stronger incentives to bail out or offer political support to larger companies than to their smaller counterparts (Knutsen *et al 2011*: 23). As these are important measures to enhance the leverage in bargains with host country governments, larger companies may thus be less in risk of becoming victims of predatory taxation and regulations that could considerably affect the expected future cash flows.

Managerial skills and technical expertise: As many of the remaining reserves are rather difficult to exploit, having the necessary managerial and technical expertise is rapidly becoming a major source of leverage in bargains with host country governments. Being present around the globe, large petroleum companies have the opportunity to recruit managers and leading professionals with a wider range of backgrounds and with the necessary technical expertise and country insight (Osmundsen 2006b: 18). Furthermore, larger companies also have the ability sustain larger R&D departments, which is imperative in developing non-replicable technology- an advantage, which again, may lead to increased bargain power in negotiations with host country governments. Finally, as aspiring leaders and professionals may see a position within a large multinational petroleum company as a step up the carrier ladder, larger petroleum companies may enjoy a competitive advantage in attracting the best and most experienced managers and professionals.

Reputation: While size may not always enhance the reputation, larger companies should enjoy an advantage when compared to smaller competitors, as many of the largest companies have sustained long term relations with host country governments.[1] Being blessed with a good name should, all things equal, enhance the risk mitigation capacity of multinational petroleum companies. A good reputation may affect the risk mitigation and exposure to political risk through two channels. First, a good reputation may be critical in negotiations with host country governments. Second, being equipped with a strong brand may also reduce the exposure to risks from societal groups, which may otherwise find installations and employees legitimate targets of acts of crime, such as sabotage and kidnapping.

[1] As larger companies often engage in larger operations, which may spark conflict with indigenous groups, larger petroleum companies may indeed become exposed to higher political risk. If politically salient enough, this could even lead governments to interfere, with the potential losses increasing considerably.

The second source of O-specific advantages, which is of particular relevance when analysing companies within the petroleum industry, is that of state ownership. By providing companies with privileged market positions in domestic markets, which may give rise to monopoly rents, and by making state capital available for investments purposes, state ownership can, indeed, contribute to the risk mitigation capacity of multinational petroleum companies, as measures to mitigate political risk are usually associated with considerable expenditures. Furthermore, as states are considered powerful stakeholders, equipped with political tools and connections seldom found among private shareholders, by bringing state interests to the table in "trilateral" negotiations over contracts and licensees, the company should, *ceteris paribus*, enhance its leverage vice versa host country governments (Knutsen *et al.* 2011: 10).

Although the upside of state ownership seems unquestionable, having the state as owner or major shareholder is, however, not without drawbacks. As governments, hungering for revenues and political support, may have other objectives than those of the company management, approval of investment projects may become hostage of excessive bureaucratic processes, which, among other things, could render the company unable to exploit first mover advantages (Knutsen *et al.* 2011: 6). Underlining the ambiguous effect of state ownership, there are, furthermore, instances where companies are more or less functioning as the government's personal bank account. By treating companies as their personal "milking cows", governments may, however, leave their own companies unable to engage in potentially lucrative foreign ventures (UNCTAD 2007: 124). Obviously posing a threat against the companies' risk mitigation capabilities, state ownership must therefore be considered a double-edged sword, which under certain circumstances, can be quite negative with respect to the companies' ability to handle political risk.

2.2 Political risk

2.2.1 Definition and delimitations

Being one of those concepts, of which a new definition is presented in every new book or article that is written about it, definitions of political risk frequently suffer from either being too vague or too restrictive. As I do not intend to make any revolutionary contributions to this debate here, I will approach the issue by using a rather well known definition of political risk. Defined by Robock and Simmonds (1989: 378) as "the likelihood that political forces will

cause drastic changes in a country's business environment that affect the profit and other goals of a particular business enterprise", political risk is assumed to include four necessary, though not sufficient, elements. First of all, political risk must represent some discontinuity (ibid.: 379). This means that regular changes, such as regular interest rate fluctuations and peaceful transition of incumbency do not represent political risk, as these are fairly predictable developments with minor impact on the business environment. Second, political risk must also be associated with some degree of uncertainty. If an event, or a policy implementation, were to be perfectly anticipated, companies would just adjust their strategies, thereby reducing political risk to nothing else than business as usual. Third, considering the sources of political risk, political forces are defined in rather general terms, not limiting political risk to government policies. This has obvious empirical implications in that events, such as terrorism and kidnappings, are also considered as elements of political risk. Finally, political risk must have a significant impact on the profit (cash flow) or other goals pursued by multinational petroleum companies (ibid.: 379). As I have argued earlier, companies are not similar in their capability of handling political risk and events and policies that effect one company's profit, may not affect another. Political risk is thus considered a matter of exposure, and not as a deterministic precondition for the allocation of upstream FDI.

A commonly debated issue related to political risk is that of risk versus uncertainty. Despite being frequently used interchangeably, risk can, according to Jakobsen (2007: 21), be separated from uncertainty in that risk is associated with a measurable likelihood of occurrence. Opposite, when confronted with uncertainty, it is impossible to calculate the exact probability of occurrence of any particular event. In reality, many of the situations facing foreign direct investors are thus a matter of uncertainty and not risk (ibid.: 21). Taking these considerations into account, my approach is therefore, that multinational petroleum companies are confronted with both political risk and political uncertainty when making investments abroad. For instance, as multinational petroleum companies engage in bargains with host country governments they may receive information that function as signals of government preferences, and eventually, their future actions. This does not mean that governments cannot surprise companies, which they have certainly done in the past. The point is that multinational petroleum companies, although to varying degree, do have knowledge that allow them to make more or less accurate inferences about the likelihood of unfavourable policies being implemented. On the other hand, getting credible information about the

capabilities and preferences of insurgencies and oppositional groups may prove more difficult and companies are thus confronted with real uncertainty.

Perhaps the most important assumption in this thesis is that companies are unequally equipped to handle political risk and thus that companies are differing in their *de facto* risk exposure. Coinciding with this, political risk can, according to Robock and Simmonds (1989: 380-382), be differentiated between *macro* and *micro* risk. While macro risk refers to unpredicted events or policies that affect all foreign companies in a fairly similar fashion, micro risk is industry or even company specific, and includes, among other things, taxation, sabotage, kidnappings and export restrictions. Prevalent and even, at times, subtle in nature, micro risk is generally perceived as being most demanding to handle since efforts to mitigate micro risk often fall on a limited number of companies. On the other hand, as macro risk includes large scale events, such as civil wars and nationalisations, the potential loss of profit from macro risk may be even greater if materialised.

Closely related to political risk, but nevertheless different by definition, *country risk* is frequently used to denote the variety of risk factors confronting foreign investors abroad (Jakobsen 2007: 23). Although used interchangeably in the literature, it seems, however, to be a rather common assertion that country risk is a wider concept, which besides political risk, also includes economic factors like interest rates and inflation. While not disregarding the difference in scope, origin and effects, in this thesis the term political risk is used to describe both political and economic factors, such as inflation. This decision is based on the assertion that even economic factors have policy implications, which may, or may not lead governments and societal group to take actions against foreign investing petroleum companies.

2.2.2 The risk generating process: sources, mechanisms and effects

While the *sources* of political risk, i.e. "the major underlying political [and social] forces than can cause abrupt policy changes", are the focus in the upcoming analyses, these are not sufficient causes, that by themselves can explain how and why multinational petroleum companies experience reduced or disrupted cash flows (Robock and Simmonds 1989: 382). Thus, to explain how multinational petroleum companies may end up with lost profits we need to move two steps further in the political risk generating process, considering both

political risk *mechanisms* and, finally, political risk *effects*. A model of the political risk generating process is depicted in figure 2.1.

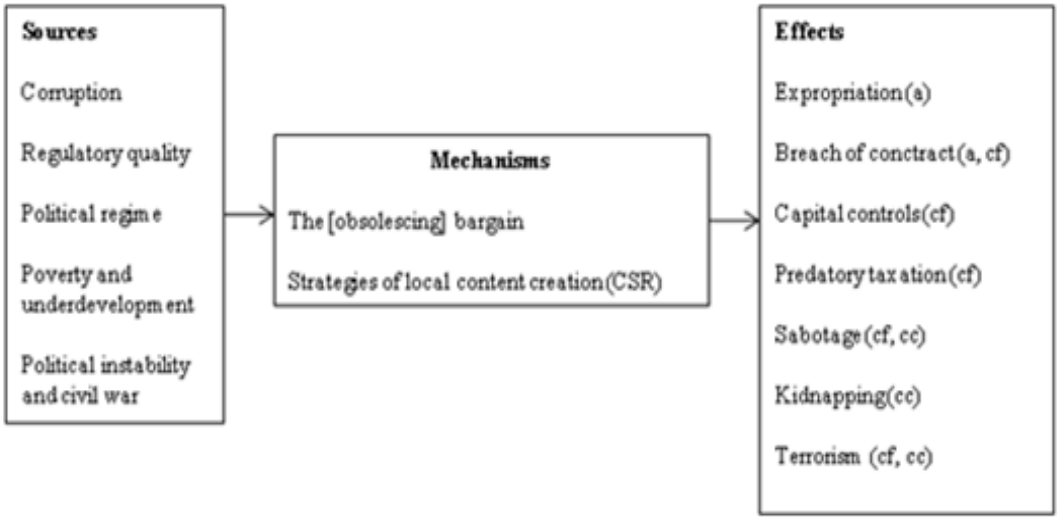

Figure 2.1 The risk generating process

(a = assets, cf = cash flow, cc = company costs)

Connecting political risk sources to political risk effects, political risk mechanisms encompass the nature and scope of the relations that exist between the company and the actors executing actions against companies, most notably the government and civil society groups. To reach agreements about financial and legal aspects of an investment project, multinational petroleum companies and host country governments engage in negotiations, which according to Vernon (1971: 47), are characterised by a critical transition of bargain power after the company has conducted its initial investments. Denoted as sunk costs, due to their irretrievability, it is believed that the immobility of the production assets, which are typical to extractive industries, creates an incentive for host country governments to renege on previously signed contracts. Under such circumstances, being equipped with the necessary O-specific advantages to secure some kind of leverage in negotiations with host country governments is therefore critical, as this may reduce the likelihood of becoming victims of expropriations or breach of contracts (BoC).[2]

[2] According to Grosse and Behrman (1992), the outcome of company-government negotiations is dependent on 1) the relative resources of the negotiating parties, 2) the relative stakes of the actors involved, and 3) the similarity of interests between the company and the government.

As petroleum companies have grown more aware of the social and economic consequences of their operations, there has been an increased focus on strategies aimed at creating local content. Denoted as Corporate Social Responsibility (CSR), these strategies emphasise a broader thinking of company responsibility, which besides internal actors, such as employees and shareholders, also encompasses third parties, such as indigenous people and local communities. There is apparently much to gain from CSR. According to van Tulder and van der Zwart (2006: 200-220), succeeding with CSR strategies is decisive in building a good reputation, which can be considered as "an intangible resource that can create and sustain a competitive advantage and enhance the performance of companies". Others, such as Kytle and Ruggie (2005) emphasise the ability of CSR to provide companies with strategically important information, which may be a valuable component in risk mitigation strategies.

The final stage of the political risk generating process is political risk effects. These are the concrete actions and policies directed against a multinational petroleum company following either fruitless negotiations or unsuccessful CSR strategies. As can be seen in figure 2.1, political risk effects cover a wide range of policies and actions. Reaching from expropriations to kidnappings of employees and local managers, political risk effects may lead to lost assets (a) or disrupted cash flows (cf), while also increasing company costs (cc) (Robock and Simmonds 1989: 386).

2.3 Sources of political risk and FDI

2.3.1 Political regime

An issue, which has received lots of attention in international political economy, is the relationship between political regime and allocation and magnitude of inward FDI (Li and Resnick 2003; Przeworski and Limongi 1993). However, so far the debate over whether democracy, or authoritarian rule, is most attractive to FDI has turned out inconclusive. Without going too much in depth, the arguments in favour of democracy are, that due to the peacefulness and transparency surrounding transitions of power, multinational companies prefer democracies to authoritarian states (Li and Resnick 2003: 185). Democracies are, furthermore, claimed to enhance the protection of property rights, while at the same time lowering the potential risk to the company's reputation, as democracies are generally more respectful to human rights (ibid.: 185-188).

Contrary to the abovementioned theories, there are scholars who hold that democracies are not in any particular way more attractive to international capital than societies with more authoritarian traits (Przeworski and Limongi 1993: 52). There are at least two reasons why this may be the case. First, not responsible to the people, and motivated by short term revenues, in autocracies, governments or self-declared omnipotent dictators are perceived as more prone to embark on policies that are profitable to international capital, even at the expense of other desirable policy goals. Second, as the concentration of power tends to be greater under authoritarian rule, authoritarian leadership may also be more efficient, since the power of making decisions rests on a limited number of individuals. As a consequence of this, negotiations are thus being conducted directly with governments or dictators, thereby avoiding to get caught up by vast and rule-governed bureaucracies.

While the abovementioned theories may all offering plausible explanations for why democracy or autocracy may be more attractive to foreign capital, for now it is assumed that the former type of considerations prevail. Following the assumptions which were made about the effect of company size, larger petroleum companies should therefore be more prone to invest in autocracies, due to their superior access to capital and political support, and their more experienced management. Accordingly, the following hypothesis is formulated:

H1a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of democracy.

When analysing the relationship between political regime and the upstream investment patterns of multinational companies, many analyses deploy the same assumption as Knutsen *et al.* (2011: 12). According to these scholars, state owned companies should, due to political, and in democracies, public scrutiny, be less prone to invest in countries where basic democratic rights are violated. On the other hand, as a majority of the state owned petroleum companies themselves originate from countries where citizens are deprived of basic democratic rights, this may not be the case within the petroleum industry. Combined with better access to capital and political support, which should increase their ability to mitigate the risk accompanying authoritarian rule, in accordance with these arguments, I have therefore formulated the following hypothesis:

H1b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower degree of democracy.

2.3.2 Political instability and civil war

Increasing uncertainty and encouraging opportunistic behaviour from governments and individuals, rapid and violent changes of political power are frequently considered an important source of political risk (Jakobsen 2006; Kobrin 1979). Usually referred to as political instability, events, such as coups and revolutions have the potential of severely lowering the materiality of an investment project. As information is frequently scarce and less reliable in times of rapid political change, transaction costs tend to climb. All things equal, this should lead multinational petroleum companies to increase their discount rates, making an investment project less competitive when compared to alternative allocations of scarce capital. Furthermore, if already present, as production facilities and employees may become caught in the crossfire in violent uprisings, political instability may lead to disrupted cash flows and force increased company costs upon multinational petroleum companies. Again, the result is reduced materiality, which would make the investment less attractive when compared with alternative allocations of capital.

Of all the sources of political risk civil war is perhaps the most dramatic one with regard to the general investment climate. Civil war may harm the operations of multinational companies through, at least, three channels. First, through increased levels of violence, the role of the military becomes more important- often at the expense of law enforcement institutions, such as the police and the court system. Leading to increased enforcement costs, property rights thus tend to suffer (Collier 1999a: 169). Second, with elevated levels of violence, the threat of assaults being committed against vital physical production infrastructure becomes imminent. These kinds of threats should be of particular importance to petroleum companies, as FDI within the petroleum industry usually entail investments in large and immobile production facilities. Third and finally, since individuals, who live in countries that are plagued by civil conflict, discount the future more heavily, opportunism tends to rise (Collier 1999b: 9). As individuals with shorter time frames are less concerned about the future, multinational petroleum companies may therefore experience a higher risk of

becoming victims of criminal assaults in the form of terrorism, kidnappings and theft, which would obviously lead to higher security and insurance costs.

Debating how political instability and civil war may influence the allocation of upstream FDI of multinational petroleum companies, the role of state ownership should be quite similar to that assumed when debating the relationship between political regime and upstream investment patterns. As both political instability and civil war tend to be negatively affecting property rights, while at the same time, raising transaction costs and levels of crime, being able to draw on state capital and political connections is an advantage. Moving on the effect of company size, larger companies again seem to have an advantage, with better access to capital, and superior managerial skills representing important preconditions for managing high-tension situations, such as coups and civil wars. On the other hand, being large may also spark unwanted attention, with more installations leading to higher risk exposure. For now it is, however, assumed that the former considerations dominate the latter. Hence:

H2a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a higher degree of political instability and likelihood of civil war.

H2b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a higher degree of political instability and likelihood of civil war.

2.3.3 Poverty and underdevelopment

While some of the countries under consideration have made remarkable progress, poverty and underdevelopment is still a pronounced feature of many of the countries that host multinational petroleum companies. Following Raj (1998: 268-289), one of the most important explanations why poverty has gained such a strong foothold in many of the countries considered here, is that the poor are excluded from credit markets, due to their inability to provide the necessary collateral. Furthermore, as the poor are struggling to keep up their daily energy balance, they are also less attractive to hire, since production in the labour-intensive industries, most frequently found in non-OECD countries, is highly dependent on the physical state of labour (ibid.: 272-273). Unemployment thus tends to be high in countries, struggling with a high share of poor people. If combined with a population

with a high proportion of young men, this has proved to be highly conflict enhancing (Collier *et al.* 2009: 24).

The effect of poverty on the investment climate is neither obvious nor undisputed. It does appear, however, that poverty increases the propensity to take part in economically motivated criminal activity, as the rewards from criminal activities, such as kidnappings, sabotage and terrorism, need to be lower in countries, in which a substantial amount of individuals are being marginalised by poverty (Briggs 2001: 9-25). Poverty may also encourage criminal behaviour in yet another profound way. Provided that countries with a higher degree of poverty tend to have weaker law enforcing capabilities, the expected risk and opportunity cost of crime declines. If one accepts that individuals and groups are generally motivated by rational and utility-maximising objectives, poverty and underdevelopment thus seems to create conditions, encouraging criminal behaviour and social unrest.

To be able to effectively handle the risks stemming from marginalised individuals and societal groups, multinational petroleum companies must have the ability to both protect and insure themselves against damage on physical production facilities and assaults against employees. Again, as security measures, such as the hiring of safety services, political risk insurance and CSR strategies may be rather expensive, larger companies with more capital at disposal and with superior managerial skills, should be better prepared to handle these kinds of risks than their smaller competitors. Therefore:

H3a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of human development and a higher degree of poverty.

For the same reasons why state owned companies may refrain from entering host countries with undemocratic political regimes, investing in countries with lower human development may be more troublesome for state owned companies, as politicians and the public may demand these companies to take comprehensive measures to improve the standard of living of affected societal groups. Again, however, as state owned companies may take advantage of having access to state capital, they may at the end decide that the costs of embarking on risk mitigation strategies, such as CSR, are acceptable in light of the potential profit from engagement in risky foreign ventures. Taking both arguments into consideration, I will

assume that the latter type of considerations prevails. I have therefore formulated the following hypothesis:

H3b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower degree of human development and a higher degree of poverty.

2.3.4 Regulatory quality

Caused by the strategic and economic importance of oil and gas, host country governments have every incentive to keep national petroleum markets under tight regulatory control and to cooperate with the domestic petroleum industry to improve productivity and competitiveness. In doing this, they may, however, inflict extra costs on multinational petroleum companies, as regulations are usually constructed to prohibit foreign companies from taking part in certain activities, while at the same time, require them to engage in others (Oatley 2008: 192). Furthermore, in their efforts to extract as many benefits as possible from having large deposits of oil and gas, and to protect the domestic industry, host country governments may find it necessary to induce high taxes and to increase royalties, which if severe and unexpected, can considerably reduce the profitability. Often referred to as rent seeking, this means that governments are actively trying to get a share of the excess profit from revenues above the market price (ibid.: 142). Finally, there are policies that are motivated by what might be called economic nationalism (Jakobsen 2007: 74-76). Creating the impression that the operations of multinational petroleum companies are the root causes of economic underdevelopment, governments may legitimise policies, which could lead to contracts being profoundly altered or terminated all together. Although not necessary equal to expropriation with regard to severity, having contracts broken, or altered, do represent major concerns to foreign investors, as profits may be reduced, while simultaneously increasing uncertainty about future revenues and frame conditions. All things equal, this should also lead to higher materiality demands, as discount rates need to be heightened to take into account the uncertainty of future returns.

Based on the arguments which were mentioned above I find it reasonable to assume that both larger companies, and companies with a higher share of state ownership, are less in danger of becoming victims of predatory regulation and taxation. The explanation is that these companies have more resources at disposal, and through that, more leverage in negotiations with host country governments. The negotiation power is further increased by the relatively

higher stakes that are in play for influential stakeholders, such as states, banks and pension funds. Based on this I have formulated the following hypotheses:

H4a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of regulatory quality

H4b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower degree of regulatory quality.

2.3.5 Corruption

Despite being criminalised by the 1997 OECD Convention on Bribery of Foreign Public Officials in International Business Transactions, corruption is still a prominent feature of many of the resource rich countries included in this analysis (Smarzynska and Wei 2000: 1). The World Bank has defined corruption as "the abuse of public power for private benefit" and it is often assumed that corruption is a symptom of weak institutions, lack of transparency in public processes and powerful public officials (Tanzi 1998: 564). As a source of political risk, the effects of corruption on the location of FDI are, however, ambiguous (Lambsdorff 2003: 231). On one side there are scholars, who claim that corruption may indeed create opportunities for foreign investors. Following the arguments of Lien (1986: 337-341), if one assumes that foreign companies are generally more efficient than their domestic competitors, corruption may indeed favour multinational petroleum companies, as multinational petroleum companies with higher efficiency, also have more money available to bribery. Corruption can, furthermore, compensate for low wages paid to state bureaucrats. Thus, governments may not need to impose heavy tax burdens on foreign capital (Tullock 1996: 6-19). As such, corruption may actually represent an L-specific advantage, as countries with higher levels of corruption could be seen as "softer targets".

While perfectly reasonable, the arguments, which were presented above, are opposed by scholars who claim that corruption distorts markets and the allocation of resources. One way, through which corruptive practices may generate political risk, is that it may lead to a race to the top, in which government officials and bureaucrats are pursuing rent seeking strategies (Mauro 1997: 87). As mentioned earlier, rent seeking behaviour harms profit in a rather direct

manner, as it leads to declining differences between operation cost and market price. The second reason why corruption discourages FDI is that corruption separates formal and informal power, leading to higher transactions costs (Smarzynska and Wei 2001: 2). While also harmful to the domestic business community, there are good reasons to believe that foreign companies, due to their relatively weaker links with the government and state officials, are affected more severely than their domestic counterparts. Finally, if multinational petroleum companies are being unveiled as corrupt, they may face harsh reactions from shareholders, business partners and customers. Although difficult to measure in terms of profit losses, it seems reasonable to assume that having their reputation dragged through the mud by negative publicity, could pose a major threat to future income and goodwill.

Although illegal, as mentioned above, larger companies with more capital at disposal should, all things being equal, enjoy competitive advantages in bribery games. Furthermore, being privileged with better access to state officials, an important channel to be awarded with licenses and concessions, larger companies should be less restrained from making investments in countries with a high degree of perceived corruption. Based on these assumptions I have therefore formulated the following hypotheses:

H5a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a higher degree of corruption.

Caused by pressure from governments, which, in democracies, may be in fear of getting politically punished by voters for illegal business conduct abroad, state owned companies should be less frequently found investing in corrupt economies. On the other hand, and analogue to the case of democracy, as there are an increasing number of multinational petroleum companies that originate from countries, in which corruptive political practices are a prominent feature, the usual arguments may not hold in the case of multinationals within the petroleum industry. Accordingly,

H5b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a higher degree of corruption.

3 Data and research design

In this chapter I will discuss some methodological issues concerning the formal analysis. Beginning with a section, in which I shortly discuss the consequences of selecting cases based on a non-probability mechanism, the chapter proceeds to the next subsection, where I elaborate on the reliability and validity of the data material. Here, the focus is on some the most common lines of criticism, which have been directed against the indicators that constitute the empirical foundation of the analysis. Following this, there will be a presentation of the indicators chosen as operationalisations of the theoretical concepts presented in the previous chapter. Finally, before moving on to the analysis itself, I will say a couple of words about the logistic multilevel model. In this subsection I will concentrate on how binary outcomes are analysed with logistic regression and how multilevel modelling enables us to handle structured data. A discussion about the consequences of including cross-level interaction terms, and a few words about causation, concludes the chapter.

3.1 Case selection

When determining what to observe there are, according to King *et al.* (1994:115-149), some important principles that should guide the selection of observations. Although not treated in great detail here, there are good reasons why scholars should try to adhere to such principles. First of all, if researchers aspire to make more general claims, observations should, as far as possible, be selected using random selection mechanisms. By avoiding selection bias, random selection creates representative samples, which is a necessary condition for making generalisations from sample to universe (Hellevik 2003: 114-115). To answer the research question I have collected a sample that consists of 26 of the 50 largest multinational petroleum companies, as ranked by Petroleum Intelligence Weekly (PIW 2010).[3] The reason why only 26 companies are selected is a rather simple one. Of the 50 companies, for which there exist publicly available data, only 26 can be classified as multinational if this is requiring that they are operating in at least two or more foreign countries.[4] Furthermore, as the top 50 ranking does not cover companies from the service sector, service companies, such

[3] The 26 selected companies are not the largest 26 companies, as large companies, such as Saudi Aramco and PDVSA, and smaller companies, such as Devon Energy and Ecopetrol, are all excluded due to their "non-multinationality".
[4] This is the result of checking all the companies´ homepages and annual and operating reports.

as Halliburton and Transocean, are not included in the analysis, although they are very much indeed engaged in upstream activities.

Similar to the selection of companies, the sample of host countries, which consists of 50 of the non-OECD countries endowed with oil and or gas reserves, is selected based on there being available and coherent data about their proved oil and gas reserves.[5,6] Resulting in a sample of 1300 pairwise dyads, these observations are clearly selected based on intention and not by randomness. Selection bias may therefore become a problem with lower external validity as the result. On the other hand, as there are aspects with the sample that may render random selection less relevant or even inferior to non-probability selection rules, I will argue that the absence of random selection, in this case, does not pose such a serious threat against the possibility of making more general claims about how political risk affects the allocation of upstream FDI for other multinational petroleum companies than those included here.

Certainly strengthening the external validity of most scientific inquiries, random selection also has its limitations. As illustrated by King *et al.* (1994: 125-126), when analysing a small sample, random selection could, in fact, prove a worse selection mechanism than non-random selection rules. The problem with random selection in these situations is that the researcher may end up eliminating focal observations from the analysis. For example, in a study of revolutions, most researchers would agree that missing out on the French or the American revolution would seriously hamper the potential of making more general claims about the nature and consequences of revolutions (ibid.: 125). In a similar fashion, as there are only a limited number of multinational petroleum companies and countries with substantial reserves of oil and gas, including these in the sample based on some random selection rule would have been accompanied with the risk of eliminating important companies such as ExxonMobil, Shell and Total, and major exporting countries like Saudi Arabia, Russia and Nigeria. Not only making the findings less relevant and interesting, it goes without saying that eliminating these observations from the analysis would raise questions about the external validity of the findings.

A second aspect of the selection procedure, which should be taken into account when debating selection rules and their effect on the external validity, is the fact that the selected

[5] Although a member of the OECD, Mexico is included in the sample. This is due to its considerable reserves and because it is the only country from Central America for which I have found consistent and reliable data.
[6] For a detailed overview of the companies and countries included in the sample, see appendix A.

sample does include a substantial part of the population.[7] In situations like this, where the sample distribution and the population distribution share a high degree of similarity, traditional estimation becomes less effective since most calculations of standard errors are estimated based on the assumption of infinite populations. With regard to this analysis, the size of the population may be fairly accurately identified, which means that standard errors will tend to be overestimated if not corrected for the fact that the sample covers a larger part of the population than the usual 5% to 10%, under which samples are considered to be drawn for an infinite population.[8] As the formal procedures of correcting for finite populations are outside the scope of this thesis, I will, according to common practice, ignore this for now. As a consequence, however, it will be more difficult to prove statistical significance in the subsequent analyses.

Operating with an intentionally selected sample, to avoid selection bias, it is critical that the selection rule does not correlate with values on the dependent variable, as this should be allowed to vary (King *et al.* 1994: 129-130). Analysing dyads between countries and companies, the dependent variable is free to vary, as dyads with negative outcome (not present) are also included in the analysis. Correlation between the selection rule and values on the dependent variable should therefore not cause selection bias. If neither randomly selected nor based on values on the dependent variable, the selection of observations must thus be dependent on values on some of the independent variables. As mentioned above, host countries are selected based on there being available information about their reserves of proved oil and gas. Choosing observations based on their values on one of the control variables should, however, not create selection bias, "as the selection procedure does not predetermine the outcome of our study" (ibid.: 137). The problem of selection bias may, on the other hand, become a problem in the selection of multinational petroleum companies. While including companies of different size, the sample does, for reasons mentioned earlier, not include the smallest multinational petroleum companies. Obviously leading to some selection bias being introduced into the analyses, the inability to include observations of the smallest companies should thus result in some caution being executed, as far as generalisations are concerned.

[7] For coverage statistics, see appendix B.
[8] One way to adjust standard errors when estimating from samples of finite populations is to use the *finite population correction factor* (FPC). If samples are close to populations the FPC falls towards 0, while it approaches 1 if samples are small relative to populations (Thompson 1992: 15).

3.2 Data

Due to restricted access to most of the datasets that explicitly deal with political risk and multinational companies, I have been forced to construct my own dataset in order to address the research question. Deriving data from several well known sources, such as United Nations Development Program (2007), the World Bank (2007a; 2007b) Freedom House (2007) and Petroleum Intelligence Weekly (2010), the new dataset consists of indicators that are mainly available on the internet. To take into account the effect of lead times, which is the period between preliminary analyses and the initiation of exploration and production, the variables used as measurements of political risk are operationalised using data from 2007. Despite rather arbitrary, by lagging these variables with three years, while simultaneously basing the dependent variable on data from 2010, I have introduced a built-in delay between the country-specific explanatory variables and the effect variable. The purpose of this is to 1) take into account that multinational petroleum companies may have based their current presence in a particular host country on information that dates back in time and 2) to take into account that the process, in which political risk sources are transformed into political risk effects, may take some time.[9]

Although the selection of publicly available data does improve the possibility of replicating the analysis, and that the lagging of the independent variables may contribute to increased realism, there are still some methodological issues, which need to be addressed before the variables are entered into the analysis. In the rest of this section I will therefore briefly discuss some of the most important methodological challenges and limitations of the upcoming analyses.

Most of the indicators applied in this analysis are composite indexes that rely on a wide range of primary sources to operationalise the underlying components of the indexes. Being mainly derived from expert reports, surveys and agency reports, the indexes thus introduce an element of subjectivity into the analysis, as they are almost exclusively derived from perceptions data. Generally, perceptions data, such as surveys and expert reports is assumed to have some rather negative consequences for the measurement and external validity because subjective assessments may frequently not meet demands for stability and consistency across

[9] In many of the cases, the presence of multinational petroleum companies has, of course, lasted longer than the suggested delay. It is, however, not available and coherent data that goes back to the time of the earliest foreign investment projects. Furthermore, lead times may, for particular projects, be considerably longer than three years.

time, cultures and observers (Bryman 2004: 70-72; Van De Vijver 2003: 143-156). Furthermore, unless reported in a manner that allows for systematic and rigorous scrutiny, perceptions data are inclined to suffer from low replicability, due to difficulties in duplicating the responses in subsequent studies. On the other hand, as perceptions are among the most important determinants of behaviour, such as entering a foreign country, using perceptions data may, in fact, increase the realism of the analysis by taking into account that company officials and consultants alike, usually adhere to their own or others' perceptions when making decisions about where to locate their investments.

A second line of criticism, which has been directed against the types of indexes mostly deployed in this analysis, claims that gathering information from a substantial number of sub components into one composite index may come at the expense of loosing valuable information. If severe enough, the loss of information could harm the measurement validity, as the final index may represent a too rigid measurement of sub components that, in reality, have very unequal effects on the outcome. Incorporating information on all the indexes' sub components into the analyses would, however, be a futile strategy, as this would only lower the simplicity of model, while at the same time, as it would increase the likelihood of being confronted with other methodological problems, such as multicollinearity and indeterminacy.[10] I thus have to live with the knowledge that my indicators do not represent perfect operationalisations of the underlying "systematized concepts" and that some information and precision is lost in the process of compiling sub components into the final indexes (Adcock and Collier 2001: 4-6).

The third line of criticism claims that the uncertainty that surrounds the index estimates is insufficiently communicated. This is a serious accusation with important implications for the analytical usefulness of these indexes, since the indexes may end up emphasising differences where there is actually a high degree of similarity (Høyland *et al.* 2010: 2). Studying two of the indexes, which are used in this analysis: the Freedom House Index and the Human Development Index, Høyland *et al.* (2010: 11-19) find that both these indexes are associated with considerable uncertainty, but also that they are able to distinguish some countries from each other. While the Freedom House Index does have problems separating countries that are located on the very top of the scale, the index is fairly able to distinguish countries located further down on the list. The same goes for the Human Development Index, which, according

[10] For a more thorough explanations of these problems, see King *et al.* (1994: 118-124).

to Høyland *et al.* (2010: 16), is quite successful in distinguishing between the world's 100 least developed countries.

Being one of the few indexes that explicitly presents uncertainty estimates, for the Worldwide Governance Indicators, the uncertainty about the index estimates is reported through error margins (World Bank 2007a). For example, debating the possibility of making cross country comparisons the scholars responsible for the WGI project show that with a 90% confidence level, for the Control of Corruption Index (CCI), error margins do not overlap in 63% of the pair-wise cross country comparisons (Kaufmann *et al.* 2010a: 12). If the confidence level is lowered to 75%, the proportion of statistically significant cross-country difference increases to 73% (ibid.: 12). All together then, it seems that the indicators chosen in this analysis, do allow for some cross-country comparison to be made. However, as there are still some considerable numbers of countries that cannot be distinguished from each other, it may become difficult to prove significant effects.

Collecting data usually entails that some data is missing. If systematic and severe enough, missing data can introduce bias in the data material, which among other things, would lead to lower external validity. According to Gelman and Hill (2007: 530), the most benign form of missing data is what is usually denoted as missing completely at random (MCAR). In these situations, the probability of experiencing missing values is equally distributed across all observations and the "missingness" does not correlate with any observed or unobserved dependent values (Hedeker and Gibbons 2006: 281). On the other hand of scale, there are missing values, which are not random (MNAR). Here, the missingness can be attributed to some value of either the dependent or independent variables. With regard to this analysis, MNAR could be a potential problem, as missing values may depend of the value of some other independent variable. For example, in countries haunted with civil war or authoritarian rule, access to reliable information is usually more limited. There is, unfortunately, no quick fix of the problem of missing values. Using STATA, observations with missing data are, by default, excluded from the analysis through listwise deletion.[11] While perhaps of particular severity in multilevel modelling, due the relatively smaller effective sample size, in this thesis, 52 out of 1300 observations are excluded. As I cannot rule out that some of these observations may be MNAR, from this then, it seems that some bias is inevitable.

[11] All observations with missing value on at least one variable are excluded from the analyses.

Although the application of multilevel modelling allows us to take into account dependency between observations, there may still be some dependency that is not controlled for. A certain type of dependency, which is of particular importance in this thesis, is that of spatial autocorrelation. Referring to a situation where the closeness between two observations may produce dependence in the predicted values on a variable, despite their potentially negative effect on the validity of the upcoming analyses, conducting formal analyses to detect and mitigate spatial dependency is outside the scope of this thesis (Thompson 1992: 238). In an attempt to control for regional effects, in conducting robustness tests in chapter four, observations from five regions are, in turn, removed from the sample.

3.3 Operationalisations

Given the ultimately qualitative nature of political risk, to secure satisfactory measurement validity, the theoretical concepts, which were put forward in the previous chapter, must be accurately measured.[12] In this section I will therefore present and discuss the indicators, which have been selected as operationalisations of the theoretical concepts presented in the previous chapter. The section begins with a presentation of the dependent variable, where I will discuss the potential validation costs of operationalising FDI allocations by using a binary variable. Having presented and debated the dependent variable, I move on to the presentation of the indicators that measure O-specific advantages and sources of political risk. Finally the control variables are presented.[13]

3.3.1 Dependent variable: presence of upstream FDI

Caused by the inaccessibility of detailed and comparable data about upstream investment projects, this thesis applies a binary dependent variable, with the values being "present" and "not present/absent". According to common practice of coding binary variables, if a multinational petroleum company is present with one investment project exceeding the 10% rule in a particular host country, it will be assigned the value 1. If, on the other hand, not operating within a county at all, or if the equity share in all investment projects in the country is below 10%, I will register the company as "not present", thereby coding it 0.

[12] For more on measurement validity, see Adcock and Collier (2001).
[13] Descriptive statistics are depicted in appendix C.

Due to the lack of an industrial overview, in the process of gathering information about foreign upstream investment projects, I have used annual reports and official webpages released and published from the companies that are included in the analysis. As these companies differ quite substantially in their report of investment activities there are some concerns regarding the validity of the data.[14] First, as the available annual reports are not all from 2010, nor either from the same years, some companies may have initiated or terminated upstream activities that are not registered in this analysis. This would obviously influence the final results, as this would lead to an inaccurate number of cases being assigned with a positive outcome. Second, due to differences in practice and national corporate legislation, not all companies report the equity share of all their foreign investments. As mentioned above, to be recorded as a foreign direct investment, this share must exceed 10%. Despite the uncertainty that surrounds some of the upstream projects considered here, I have chosen to include these observations in the analysis. This decision is based on the fact that a large majority of investments within the upstream segment are exceeding the 10% limit, thus making it quite likely that even those, for which I do not have the information, are falling into the FDI category.

Using a binary variable, where the value "present" is dependent on only one observation passing the rule of inclusion, obviously has consequences with regard to the measurement validity of the indicator and the inferences that can be derived from the analysis. First, while defined as any investment exceeding a 10% equity share, foreign direct investments are, with regard to political risk exposure, not a homogenous group of investment strategies. Besides the fact that petroleum companies with, on average, a larger portion of equity (thereby with more to lose) are treated in the same manner as companies with less equity at stake, the nature of the FDI may also vary considerably between different host countries and companies.[15] In some countries multinational petroleum companies are engaged in joint ventures with national petroleum companies. Potentially reducing the risk exposure through the creation of shared interests between host country governments and companies, these investment strategies are clearly distinguishable from strategies involving independent subsidiaries operating without the protection provided by formal contracts with domestic business. Second, as upstream FDI may entail operations in multiple fields within the same country, coding companies with only

[14] Private companies from industrialised countries, such as Shell, BP and Statoil, seem to be more thorough in their report of foreign operations than state-owned companies from non-OECD countries.
[15] FDI may entail equity shares in multiple basins and fields, with companies having different equity shares across fields.

one project exceeding the 10% rule as present can lead to inaccurate inferences about the real exposure to political risk. The reason is that government induced risk in general, and socially induced risk in particular, may be unequally distributed within the same host country. Hence, by coding a company as present based on only one observation, there is a danger of underestimating the real level of political risk exposure.

3.3.2 Dependent variables

Company size

Published annually by Petroleum Intelligence Weekly (PIW 2010) the Top 50 Petroleum Companies ranking, and the more extensive Top 100 Petroleum Companies, have become some of the most frequently cited sources when assessments and comparisons about the size of the world's largest petroleum companies are made. Due to restricted access to the Top 100 ranking, the scores on the publicly available Top 50 are used a proxy of size-related O-specific advantages. Ranking petroleum companies according to their 1) reserves and production of liquids and gas, 2) products sales and distillation capacity, 3) revenues, 4) net income, 5) total assets, and 6) number of employees, the PIW index represents the unweighed sum of the sub-rankings on the abovementioned areas, where lower values are assigned to larger companies. In the September 2010 ranking the lowest value was assigned to ExxonMobil (PIW =37), while the smallest company to get into the sample was the Chinese company CNOOC (PIW= 315).

Encompassing many of the principle factors that should be decisive in determining a company's O-specific advantages, the PIW index is considered to be the best available alternative to operationalise company size. However, although covering some of the most important features that are assumed to influence the state and nature of the O-specific advantages, the PIW index does not provide direct information about intangible assets, such as knowledge, technology and managerial skills. As intangible assets are important elements in the theoretical definition of O-specific advantages, using an indicator, which only measures tangible assets, may lead to a reduction of the measurement validity. Despite these potentially shortcomings, however, as the endowment of intangible assets to a certain degree depends on there being some financial volume and operational experience, using a proxy that

encompasses data on both assets, reserves, revenues and income, should serve the purpose of identifying likely differences in intangible assets as well.

Besides being unable to measure intangible assets, the properties of the PIW index also raise some methodological concerns, with the level of measurement being the most prominent one. As the distances between the values are rather unevenly distributed, treating the index as an interval scaled variable becomes somewhat more problematic than if the values were following an even distribution. Though it would be possible to remedy the problem of level of measurement by creating n-1 dummy variables, this would make the interpretation process rather comprehensive. Furthermore, as the variable is included in interaction terms, the product term will suffer from being rather difficult to interpret given the ordinal scaling. Based on this I have therefore generated a new variable, PIW2, which separates multinational petroleum companies with PIW values exceeding 90 from those companies, of which the PIW scores are equal or below 90. The rational behind this threshold is that the companies with PIW scores of 90 or below must all be considered as "super majors" in today's petroleum industry.[16] Including all of the remaining four members of what were once the Seven Sisters (ExxonMobil, Shell, BP and Chevron), US integrated ConocoPhillips, China's CNPC, and Europe's largest integrated company, Total, I suspect the size related O-specific advantages to be largest for these companies, given their relatively longer operating history and larger network of stakeholders.

State ownership

Following the theories, which were highlighted in Knutsen *et al.* (2011), investment patterns of state owned companies are expected to differ from their private competitors. To find information about the degree of state ownership, I again turned to Petroleum Intelligence Weekly (PIW 2010), which simultaneously with ranking the 50 largest petroleum companies also presents an overview of the percentage of the stocks that are owned by the state. Although highly accurate inferences about the effect of state ownership may be derived from the original PIW ownership overview, there is research that gives us reasons to believe that the strategic importance of state ownership is dependent on certain thresholds being exceeded (Knutsen *et al.* 2011: 16). Despite a matter of home country legislation, holding a majority of

[16] The phrase "super majors" is usually applied on the remaining members of the Seven Sisters, which through their membership in the Consortium of Iran dominated the international petroleum industry from 1940 to 1970.

the shares usually means more influence when important decisions, such as the entry into a foreign country, are made. Based on these assumptions, I have therefore recoded the original variable into a new ownership indicator, separating companies with state shareholding exceeding 50% from those where the state owns less than 50%. The variable, with the name S_OWNSHIP2, will be assigned the value 0, if the state owns less than the half of the equity share and 1 if the government's share of the stocks exceeds 50%. For simplicity, the former will be denoted as private companies and the latter as state owned companies.

Political regime

As highlighted in the theoretical discussion about the effect of democracy on inward FDI, it appears to be no consensus over whether or not multinational companies prefer democracy to authoritarian rule. To analyse how this relationship is materialising within the petroleum industry, I will use Freedom House (Freedom House 2007) and their Freedom in the World Index (FHI) to measure the effect of host countries regime. Ranking countries and territories based on their perceived respect of political and civil rights, countries are given scores on a 0.5 per interval scale reaching from 1 to 7. While countries receiving scores from 1 to 2.5 are perceived as being "free", countries and territories falling below this threshold are either being classified as "partly free" (3.0 to 5.0) or "not free" (5.5 to 7.0) (ibid.: 2007). In order to get more intuitive results when measuring the effect of political regime, the indicator is reversed with higher values being assigned to more democratic countries.

Political instability and civil war

By increasing transaction costs, and through the elevation of levels of crime and violence, political instability and civil conflicts are assumed to encourage governments and civil society groups to initiate actions that could harm profit. As a proxy of the likelihood that multinational petroleum companies will experience reductions or terminations of cash flows caused by rapid and violent political change or events, I will use the Political Stability Index (PSI) from the WGI (World Bank 2007a), which is "capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism" (Kaufmann *et al.* 2010b: 4). The variable has a minimum value of -2.5 and a maximum value of 2.5.

Poverty and underdevelopment

In accordance with theories suggesting that the alternative costs of crime and civil unrest decline with lower standards of living, an indicator, measuring human development is included in the analysis. Being one of the most frequently used measures of socioeconomic development, this analysis applies the United Nations Human Development Index (HDI) from 2007 as a proxy of the propensity of marginalised people to engage in criminal actions, targeting installations and personnel of multinational petroleum companies.[17] The 2007 HDI consists of three subcomponents. First, the prospect of living a long and healthy life is measured using data on life expectancy at birth. Since the life expectancy may not be equal to zero, a value of 25 years is applied as minimum value. Obviously arbitrary in nature, the minimum goalpost is assumed to be the lowest life expectancy that, in theory, can secure a society's survival over time (UNDP 2007: 355-356). Moving to the other side of the scale, the maximum value is derived using the highest observed life expectancy to date. As of 2007 this was 85 years (ibid.: 355-356).

The second dimension of the HDI is access to knowledge. Composed of two sub-indices measuring 1) the adult literacy rate and 2) gross enrolment ratio, these sub-indices are merged into one composite measure by adding the two indices together with 2/3 weight being put on literacy rates and 1/3 on gross enrolment rates. For the composite measure, the minimum value is assigned the value of zero, while the maximum goalpost corresponds to a value of 0.99. Third, to measure the decency of life, the HDI index uses the gross domestic product per capita adjusted for purchasing power parities (GDP per capita, PPP US$) to measure "all the dimensions of human development not reflected in a long and healthy life and in knowledge" (ibid.: 355-356).[18] Finally, having calculated the values on the sub indices, the scores are simply aggregated to get the final Human Development Index by taking the unweighted mean of the three sub-components. This produces an overall index with values reaching from a theoretical maximum value of 1 and a theoretical minimum value of 0.

[17] Although being aware of the stark criticism which has directed against the HDI index from scholars such as Raj (1998), I find this to be the best available indicator, by which a sufficiently high number of countries are measured.

[18] There has been a change in the measurement of decency of life. While the 2007 index applied the gross domestic product, in 2010 the index uses the gross national income, which also includes interests and dividends.

Regulatory quality

Labeled as "the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development", the Regulatory Quality Index from the WGI (World Bank 2007a) captures the perhaps most important dimension of political risk, namely that of regulatory quality (Kaufmann *et al.* 2010b: 6). While perhaps representing one of the best available indicators of the risk that governments will implement regulations that could harm profits, using the RQI also has its clear limitations, as it is only measuring what I have earlier referred to as macro risk. In other words, as a proxy of regulatory quality, the RQI cannot identify the political risk associated with government regulations of a particular company or industry. On the other hand, however, since the quality of the general regulatory regime could be an indicator of the likelihood that governments will impose highly unfavourable regulations on one particular company, the RQI does, to a certain degree, function as a proxy for micro risk as well. Similar to the PSI index, the RQI index has a theoretical maximum value of 2.5 and a minimum value of -2.5.

Corruption

As mentioned in the previous chapter, corruption is a prominent feature of many of the countries included in this analysis. To operationalise the risk that stems from corruptive practices among politicians and state officials I have selected the Control of Corruption Index (CCI) from the WGI (World Bank 2007a). Capturing to what extent corruption, and the use of political power for private gains, is present within the government and the state apparatus, the CCI serves as a proxy of the likelihood that profits are lost or reduced as a consequence of rent seeking government polices and political practices that could significantly increase transaction costs. The variable has maximum and minimum values of -2.5 and 2.5 respectively, where higher values are given to countries with better control of corruption.

3.3.3 Control variables

Proved reserves

Upstream FDI within the petroleum industry are motivated by the acquisition of natural resources at a lower price than in the home markets (that is if there are any petroleum resources available at the home market). When making investments abroad, the amount of oil

and gas that is available for extraction is therefore a primary concern to multinational petroleum companies. However, to be interesting to multinational petroleum companies, fields and basins must also be potentially profitable. Taking both the amount of oil and gas, and the likelihood of profitable extraction into account, one of the most common indicators of the availability and potential profitability of oil and gas is proved reserves. Defined by the International Energy Agency (IEA 2008: 198) as "hydrocarbons that have been discovered and for which there is a 90% probability that they can be extracted profitably (on the basis of assumptions about cost, geology, technology, marketability and future prices)", it seems quite obvious that the size of the proved reserves should influence the location of upstream FDI.[19] Based on numbers from the International Petroleum Encyclopedia (PennWell 2007), proved reserves in oil will be assigned in billion barrels (bbl), while the proved reserves of natural gas are operationalised using trillion cubic meters (tcf).[20] Both variables are log transformed to remedy the potentially troublesome effects of substantial right skewness.

WTO membership

In the previous chapter it was mentioned that the scrutiny of international organisations should reduce the magnitude of expropriations and predatory regulatory policies. As proxy of the influence of international organisations I apply a binary variable, which based on the 2007 membership overview, separates host countries that are members of the World Trade Organisation from those that are not (WTO 2010).[21] Succeeding the General Agreement on Trade and Tariffs (GATT) in 1995, the WTO consists of the three components: a set of principles and rules, an intergovernmental bargain process and a dispute settling mechanism (Oatley 2008: 23-29). While the principles and rules underline the importance of free trade, WTO also contributes to free and non-discriminating trade through its intergovernmental bargain process and its dispute settling mechanism. In accordance with the common practice of coding binary variables, membership is coded 1, while non-membership is assigned with the value 0.

[19] For more on classification of reserves, see World Energy Outlook (IEA 2008: 198-200).
[20] As there are different methods to calculate proved reserves, the numbers have been cross-checked against the data in the BP Statistical Review. No significant deviations were detected.
[21] The webpage does not specifically show the member states in 2007. Instead the time of entry is reported. This is why the reference is provided for year 2010.

Inflation rate

Despite being put forward as one the most important obstacles to economic development and financial stability the economic and social costs of inflation are, according to Romer (2006: 547), ambiguous. As I will not make this a lengthy affair, for now, I will assume that inflation influences companies' entry decision through either of two effects: the direct uncertainty effect and/or the indirect signal effect. While the former effect increases uncertainty by making current and future price and costs estimates less reliable, the latter effect works together with political risk factors through its function as an indication of poor governance (ibid.: 550). To measure inflation rates this analysis applies the annual average inflation change as it is presented in the 2007 World Economic Outlook Database, which is publicised by the International Monetary Fund (IMF 2007). To control for right skewness, the variable is entered logarithmically into the analysis.

Population

The rational behind including population as a control variable into the analyses can be found in the vast literature about civil war. According to scholars, such as Fearon and Laitin (2003: 81), there are reasons to believe that countries with larger populations will be more prone to implode into civil war, as the number of potential rebels increases with higher population numbers. Furthermore, as the population increases, so too is the pressure on the society's scarce resources. Considered in a context of political risk, countries with higher populations may thus appear as more risky, as there will generally be more people depraved for basic human demands. To measure population this analysis uses the 2007 data from the World Bank Group database (The World Bank 2007b). Again, as there are some observations (i.e. China and India) that exert disproportionately strong influence on the mean, the variable is log transformed to take into account right skewness.

3.4 Analysing binary outcomes

When the dependent variable is dichotomous, three of the basic assumptions of ordinary least square regression (OLS) are violated (Menard 2002: 6-11). First, as opposed to the case where the dependent variable is continuous, the relationship between the independent variables and the binary dependent variable cannot be regarded as linear. Instead the relationship between the dependent variable and the independent variables can be depicted as an S-shaped curve,

with marked floor and ceiling characteristics. Second, the assumption of homoscedasticity, which means that the residual variance is constant across different values of the independent variables, does not hold. The result is that the least square estimates do not always represent the most effective estimates, as standard errors are not minimised (ibid.: 7). Third and finally, residuals in logistic regression are not normally distributed; therefore, "the results of hypothesis testing or construction of confidence intervals for regression coefficients will not be valid" (ibid.: 7).

Rendering ordinary OLS regression unsuitable for analysing binary outcome variables, the abovementioned violations call for an alternative model of estimation. Among these, the most frequently used is logistic regression, which, opposed to OLS regression, does not assume substantive linearity and normal and homoscedastic residual variance distribution. The logistic model, furthermore, uses maximum likelihood method of estimation, which although sharing the same purposes as least square methods (which is to minimise the standard errors), applies an iterative approach "to find the parameters that best fit the data" (Skog 2005: 362). In the iterative process, a tentative estimation is tested and re-estimated until "the improvement from one step to another becomes negligible", ultimately leading to the maximisation of the log likelihood function, which expresses the likelihood of getting the observed value on the dependent variable given the values of the parameters and the independent variables (Menard 2006: 14).

Coding the values as 1 and 0, in logistic regression, the mean of the dependent variable equals the probability "that a case will fall into the higher of the two categories for the variable" (Menard 2002: 6). Thus, with regard to the analyses conducted in this paper, the logistic regression model is aimed at estimating the probability that a company will be present in a host country given the values of their parameters. However, as the predicted probability of being present in a host country may either exceed or fall below the possible values of 1 and 0 respectively, it might be more useful to express the probability of being present in a host country in relation to the probability of not being present in a host country. One way to obtain such a measure is to use odds, which is given by the formula:

$$Odds = Y/(1-Y)$$

, where Y is the probability of being present, while $1-Y$ is the probability of not being present in a host country (Skog 2006: 355).

One of the attractive features of odds is that they have a minimum value of 0. Unfortunately, in cases where Y > 0.5, the odds may still exceed 1. Given that the possible values on the dependent variable should all fall between 0 and 1, odds that exceed 1 are therefore problematic. To produce a dependent variable with no upper or lower threshold, we thus transform the dependent variable from odds to logits by taking the natural logarithm of the odds. The logit, which break even corresponds to the situation where the number of positive cases equals negative cases, has the advantage of being able, in principle, to vary from negative infinity, when the proportion is close to 0, to positive infinity, when the proportion is close to 1 (Skog 2005: 355). Furthermore, having transformed odds into logits, the relationship between the independent variables and the logit appears linear in form. This makes it possible to analyse binary outcomes by methods that share close similarity to traditional OLS. The model with the logit as the dependent variable is depicted in the following equation:

$$Logit\ (upstfdi) = a + b_1*pOILres + b_2*pGASres + b_3*WTO + b_4*Inflation + b_5*Population + b_6*FHI + b_7*PSI + b_8*HDI + b_9*RQI + b_{10}*CCI + b_{11}*PIW + b_{12}*S\_Ownship$$

Despite its appealing characteristics, unfortunately, the logit has no intuitive interpretation. In commenting on the results from the analyses, the coefficients are thus transformed back to odds ratios (OR), which as illustrated below, are derived by taking the exponential function of the regression parameter

$$OR = e^b$$

where e is the natural logarithm (2.718) and b is the regression parameter.

To interpret the OR: when the regression parameters take on values above 0, the OR exceed 1. For example, when the parameter = 0.3, the OR = 1.35. In this case, the odds of being present increase with 35% when the independent variable increases with one unit. On the other hand, when the parameter falls below 0, indicating negative effect of the independent variable, the OR falls below 1, with the difference between 1 and the OR being the odds. For example, when the OR has a value of 0.75 the odds of being present decrease with 25% for every one unit increase in the independent variable.

3.5 Analysing structured data

By investigating how companies differ in their ability to handle political risk, and if this is influencing the geographical allocation of upstream FDI, we are, in reality, analysing units on two different analytical levels. As illustrated by figure 3.1, the political risk indicators describe properties of level-1 units (host countries), while the O-specific advantages describe properties of level-2 units (companies). We are thus dealing with so-called structured or hierarchical data, in which the relationship between political risk and investment patterns are expected to be more similar when comparing host countries within one company's investment portfolio, than if countries in different investment portfolios are compared across companies.

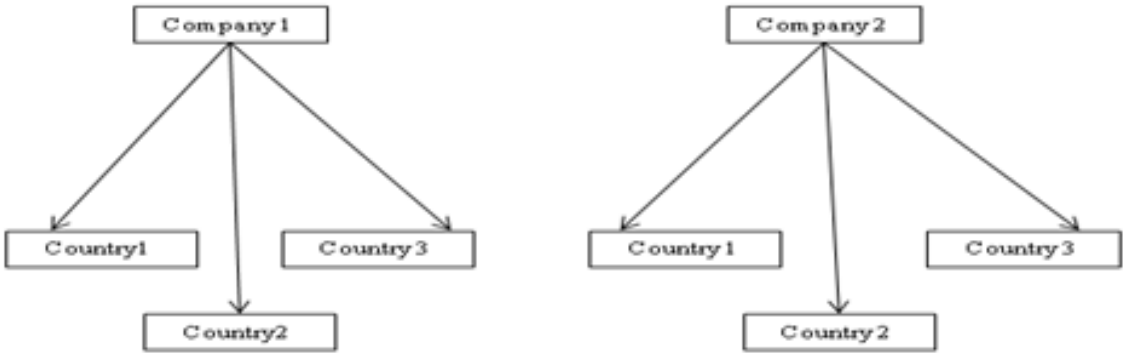

Figure 3.1 Structured data with companies as higher level units

One of the consequences of having structured data is that one of the basic conditions in traditional logistic regression, namely that of independent observations, is violated. From the literature about non-hierarchical logistic regression we know that observation dependency creates less reliable estimations, as standard errors tend to be underestimated (Bickel 2007: 111). All other things equal, this will increase the risk of making type-1 errors, which means that a true null-hypothesis is falsely rejected. To analyse data material with dyadic or hierarchic structure, we must therefore use a method that allows us to handle non-independent observations. The logistic multilevel regression model is such a method.

The most important characteristic separating multilevel regression from classical regression is that intercepts and coefficients are allowed to vary across groups (Bickel 2007: 105, Snijders and Bosker 1999: 1). As illustrated in table 3.1, intercepts and coefficients are divided into a random and a fixed component. While the random components capture the variance in

intercepts and slopes across groups, the fixed components are analogue to ordinary level-1 coefficients, and display a weighted average for intercepts and coefficients across all groups (Bickel 2007: 125-127).

Table 3.1 Fixed and random components in multilevel modelling

Model	Equation	Random comp.	Fixed comp.
Level-1	$\text{Logit}(Y) = \beta_{oj} + \beta_{1j}X_1 + \varepsilon_{ij}$		
Level-2	$\beta_{0j} = \gamma_{00} + \mu_{0j}$ $\beta_{1j} = \gamma_{10} + \mu_{1j}$	μ_{0j}, μ_{1j}	γ_{00}, γ_{10}
Full	$\text{Logit}(Y) = \gamma_{00} + \gamma_{10}X_1 + (\mu_{0j} + \mu_{1j}X_1 + \varepsilon_{ij})$	μ_{0j}, $\mu_{1j}X_1$, ε_{ij}	γ_{00}, $\gamma_{10}X_1$

3.5.1 Multilevel models with more complex structures

The structure depicted in most multilevel models within the social sciences is an example of what is often denoted as "pure hierarchies" (Hox 2011: 314-315). In a pure hierarchy, the lower level units are nested or ordered according to the structure illustrated in figure 3.1. However, in reality, many of the phenomena studied in the social sciences include even more complex structures than the ones described in conventional multilevel models. To address the issue of more complex structures, scholars, such as Fielding and Goldstein (2006) and Hox (2011), have extended multilevel models to also include cross-classification and multiple memberships. While the former kind of structure refers to a situation where level-1 units may be classified according to more than one group variable (level-2 variable), the latter kind of structure is characterised by level-1 units belonging to more than one group at the same time (Hox 2011: 314-324).

In this thesis, the data structure can be described as one of *perfect multiple membership*. As mentioned above, the dataset consists of 1300 company-country dyads, which may also be considered a hierarchic structure with host countries being grouped by the multinational petroleum companies' investment portfolios. To allow the dependent variable to vary, every

host country included in the sample are paired with every multinational petroleum company, with some dyads being associated with negative outcomes (not present, 0), while others are assigned with positive value (present, 1). To approach the issue of perfect multiple membership, this thesis applies longitudinal analyses with repeated measures, of which the data structure shares a high degree of resemblance with perfect multiple membership. It is important, however, to have in mind that instead of repeatedly measuring the same level-2 unit at different occasions (i.e. at different points in time) in this analysis we are using longitudinal modelling to measure multinational petroleum companies at different points in space (i.e. host countries).

3.6 Analysing interaction

According to the abovementioned hypotheses, multinational petroleum companies´ O-specific advantages (Z) are expected to modify, or amplify, the effect of political risk (X) on the odds of being present with upstream FDI in a country (Y). To investigate this issue, cross-level interaction terms are included into the logistic multilevel regression models. Being the "product of the two independent variables thought to interact in their effects on the dependent variable", by including interaction terms into the basic models, it becomes possible to monitor the joint effect of two, or more, variables and to evaluate their significance (Friedrich 1982: 798).

Despite their appealing properties, the inclusion of interaction terms into regression models does not come free of costs. First, when interaction terms are included in the basic model, the interpretation of the included coefficients becomes less straightforward (Friedrich 1982: 798). Instead of being the measurement of the general effect of either variable, the coefficients are now showing the effect of either two, or more, variables, when the other included variables are assigned with the reference value, which in most cases is the value 0 (Skog 2005: 303-304). Whether or not this change of interpretation poses a threat against the scientific value of the analysis will not be debated in detail here. However, as interaction terms seem to be used rather vigorously in regression analyses, it appears that the potential loss of intuitiveness is justified by the information that can be gained from specifying regression models with interaction terms.

The second consequence of including interaction terms into regression models is that the hypothesis testing becomes somewhat more intricate. As explained by Braumoeller (2004: 3-4), when an interaction term is included in a model, one cannot interpret significance independently of the value on the other variable(s) included in the interaction term.[22] For example, if the PSI coefficient is significant when the variable is part of an interaction term, any assessments of its significance are restricted to the situation where the value of the other variable is 0. For simplicity, let us say that the other variable is a dichotomy separating the largest multinational petroleum companies (0) from other multinational petroleum companies (1). Since the PSI coefficient is now showing the effect of political instability for the largest companies, assessments about its significance is confined to the observations that fall into the reference category on the other variable, which in this case are multinational petroleum companies with PIW value <90. According to some scholars, such as Brambor *et al.* (2006) and Ai and Norton (2003), the conditionality that characterise the effects in multiplicative regression models renders assessments about significance based on the statistical significance of the interaction term, somewhat less precise. The reason for this is that even if the interaction term, itself, turns out as non-significant, the interaction effect may still be significant for most observations (Ai and Norton 2003: 129).

To address the issue of the statistical significance of conditional effects, I will complement the traditional t-statistics with F-tests, in which the *joint significance* of the interaction term and its constituent components are tested.[23] In these tests, the hypothesis that the interaction term and its constituent coefficient are all simultaneously 0, is tested. If this is not the case, we cannot reject that the variables are jointly significant. Following Blackwell (2008: 3), F-tests of joint significance are particularly suitable for testing interaction and quadratic terms, "as these will only have no effect at all when both coefficients are all of their constituent coefficients are equal to zero". This does not mean that I will disregard the results from the t-statistics, as they may still provide valuable information about the significance of the interaction effect for a substantial portion of the observations. In cases where the interaction term or the constituent coefficients are displaying non-significant effects, confronted with F-statistics indicating joint significance, I will, provided that the effects are fairly strong, thus

[22] This is why scholars, such as Friedrich (1982), Ai and Norton (2003) and Brambor *et al.* (2006), stress the fact that effects found in multiplicative models are conditional and not average effects.
[23] In several articles about interactions, the sub components are integrated into the pluralised "interaction terms".

assume that "something significant is going on in the data", thereby adding contingent to the reported results (Friedrich 1982: 821).

A third and final concern surrounding the inclusion of interaction terms is multicollinearity. Since interaction terms, almost by definition, are strongly correlated with the variables included in the terms, multicollinearity may become a problem.[24] This problem can, however, *partly* be mitigated through mean centering, by which every value on a variable are subtracted of the variable mean. The result is a new variable with zero as the new mean. There are two ways of centering variables in multilevel regression analyses: grand mean centring and group mean centring. As the names suggest, when centering at the grand mean, the mean of all observations is subtracted from every value on a variable. This is the usually procedure in non-hierarchical regression. In multilevel models, it is also possible to centre at the group mean, which means that level-1variables are subtracted of the mean of the group they belong to. According Enders and Tofighi (2007: 132) this is the better method when interaction effects are of substantial interest. Following this recommendation, in the upcoming analyses level-1 variables are therefore centered at the group mean. Before moving on the analysis a few words of precaution is warranted. Although centering variables may reduce multicollinearity between an interaction term and its components, in the case where one of the components is a categorical variable, transforming the value 0 to the variable mean would yield less meaningful interpretations. As this is the case in this analysis, where the two higher level variables are both dichotomous, a fairly high degree of multicollinearity is, despite its potential costs, therefore tolerated.

3.7 A few words about causation

If one accepts Gerring's (2008: 169) minimal definition of causes, which suggests that causes may be defined as "events and conditions that raise the probability of some outcome occurring", the ability to establish causality based on the findings in this thesis becomes somewhat restricted. The inability to draw causal inferences is, first and foremost, limited by the fact that the presence of multinational petroleum companies may, in fact, increase the level of political risk in a country.[25] As such, the cause and the effect may not be independent of each other. Moreover, as discussed above, dependence between the included independent

[24] The consequences of multicollinearity are, according to Hamiliton (2009: 224), increased standard errors, unexpected changes in coefficient magnitudes or signs, and non-significant coefficients despite a high R^2.
[25] This is discussed in some detail in chapter five.

variables may, furthermore, hamper the ability to make causal inferences. In quantitative research designs, such as the one applied here, dependent causes manifest themselves as multicollinearity between the independent variables, which, among other things, means that the unique cause of a given effect becomes more difficult to detect. Finally, following from the discussion in the previous chapter about sources, mechanisms and effects of political risk, it seems clear that the current research design is unable to fully take into account the causal mechanisms, i.e. the range of intermediate effects in the process connecting the ground cause to the effect. For this reason, and those mentioned above, this thesis does therefore not aspire to establish causality between, on one hand, political risk and O-specific advantages, and, on the other hand, the presence of multinational petroleum companies.

4 Analyses

In this chapter I will present and discuss the results from the formal analyses. To get a better overview of the data material, the chapter begins with a preliminary analysis, in which the data is analysed without the inclusion of interaction terms. In section two, the models are then extended with interaction terms to test the hypotheses put forward in chapter two. The results from these models are first presented and described before being subjected to regression diagnostics and robustness tests.

Although statistical significance may be of somewhat less interest due to the fact that the observations are not randomly selected and that the standard errors are not adjusted for a finite population, standard errors and the significance of the coefficients are, nevertheless, reported. Furthermore, despite being less intuitive than odds and odds ratios, in the upcoming analyses, the results are reported in logits. The rational behind this decision rests on two grounds. First, according to Menard (2010: 15), the logit is, mathematically, the better way to analyse dichotomous dependent variables because the logit is linearly related to the independent variable. To improve the reader friendliness, when commenting on the results the logits are, however, transformed back to OR, which have a more intuitive meaning. Second, as the focal point in the second part of this analysis is interaction effects, using the logit scale provides more intuitive interpretations, because when reported in logits, the interpretation of the interaction terms is similar to that in ordinary least square regression (Skog 2005: 414).

4.1 Preliminary analysis

In the preliminary analysis, the effect of political risk is being investigated without the inclusion of interaction effects. To take into account the non-independence that characterises relations between observations in longitudinal data structures (remember that longitudinal data is the same as repeatedly measuring each company across the same host countries), I have a fitted a random-intercept model, in which the intercept is allowed to vary between companies. To control for the individual effect of each source of political risk, the political risk variables are, in accordance with the hypotheses, entered separately into different models before fitting the full models, which includes all political risk variables and the two company variables. The results from the preliminary analysis are depicted in table 4.1, where standard errors are reported in parentheses below the logit coefficients. Sample, variance and summary

statistics are, furthermore, reported for each model, with the sample size and number of groups being reported for each model. For variance, the intraclass correlation is reported using rho, while the summary statistics report the log likelihood function and the Akaike Information Criteria (AIC).

Table 4.1 Results from preliminary analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
fhi_rev	0.102*					0.110*	0.110*	0.110*
	(0.052)					(0.061)	(0.061)	(0.061)
psi		0.233**				0.280**	0.280**	0.280**
		(0.102)				(0.129)	(0.129)	(0.129)
hdi			1.127			-0.011	-0.011	-0.011
			(0.722)			(0.940)	(0.941)	(0.940)
rqi				0.197		0.373**	0.374**	0.373**
				(0.127)		(0.187)	(0.185)	(0.187)
cci					-0.091	-0.746***	-0.746***	-0.746***
					(0.168)	(0.253)	(0.253)	(0.253)
piw2							-1.129***	
							(0.304)	
s_ownship2								-0.019
								(0.361)
ln_poilres2	0.160**	0.149**	0.143**	0.160**	0.164***	0.157**	0.158**	0.157**
	(0.063)	(0.063)	(0.064)	(0.063)	(0.062)	(0.055)	(0.065)	(0.065)
ln_pgasres2	-0.006	-0.026	-0.034	-0.023	-0.020	0.055	0.055	0.055
	(0.056)	(0.057)	(0.061)	(0.059)	(0.064)	(0.068)	(0.068)	(0.068)
ln_inflation	0.274***	0.331***	0.322***	0.368***	0.252**	0.327***	0.327***	0.327***
	(0.106)	(0.107)	(0.108)	(0.121)	(0.112)	(0.123)	(0.124)	(0.124)
ln_population	0.107**	0.189***	0.152***	0.138***	0.113**	0.132**	0.132**	0.132**
	(0.042)	(0.051)	(0.045)	(0.042)	(0.045)	(0.053)	(0.053)	(0.053)
wto	-0.271	-0.169	-0.126	-0.207	0.050	-0.123	-0.123	-0.123
	(0.199)	(0.180)	(0.178)	(0.190)	(0.202)	(0.221)	(0.221)	(0.221)
cons	-2.459***	-2.307***	-3.129***	-2.252***	-2.376***	-2.991***	-2.162***	-2.984***
	(0.363)	(0.354)	(0.639)	(0.356)	(0.377)	(0.798)	(0.810)	(0.808)
N	1248	1248	1248	1248	1248	1248	1248	1248
Groups	26	26	26	26	26	26	26	26
rho	0.157	0.157	0.156	0.156	0.160	0.160	0.098	0.160
log likelihood	-653.234	-652.522	-653.901	-653.925	-654.990	-646.482	-640.909	-646.480
AIC	1322.469	1321.045	1323.802	1323.851	1325.980	1316.965	1307.820	1318.962

* p<0.10 ** p<0.05 *** p<0.01

By indicating a weakly positive tendency toward more democratic institutions being preferred by multinational petroleum companies, the result from model 1 shows that an increase of one unit on the reversed FHI increases the log odds of being present with 0.102. Transformed into OR the value is 1.107, which means that the odds of being present increases with around 10% when the reversed FHI increases with one unit. The effect is significant, albeit at the 10% level only. When entered into model 7 and 8, the effect of political regime becomes somewhat stronger, with the log odds now increasing with 0.110 when the reversed FHI increases with one unit. While still only significant at the 10% level, these results show that the odds that multinational petroleum companies are present now increases with around 11% (OR =1.11) when the regime indicator increases with one unit.

Significant at the 5% level, and with a weak positive effect when analysed separately, the results displayed in model 2 tell us that the log odds of being present with upstream FDI increases with 0.233 when PSI increases with one unit. In other words, it appears that political instability is discouraging multinational petroleum companies from making investments, as the odds of being present with upstream FDI increases with around 26% (OR = 1.26) for every unit of improvement in the political stability indicator. Similar to the reversed FHI, the effect becomes stronger when the PSI is entered into model 7 and 8, in which the effect of a one unit increase in the PSI equals an increased odds of being present with upstream FDI of 32% (OR= 1.32). The results are also significant at the 5% level.

Displaying a strong positive effect on the log odds that multinational petroleum companies are present with upstream FDI when considered separately in model 3 (logit = 1.127), in model 7 and 8, the effect of human development displays a considerable shift in direction and strength. Here, a one unit increase in the HDI now appears to reduce the log odds of being present with upstream FDI with -0.011. Equalling an OR of 0.98, the effect is, however, not significant at any sensible level.

Conforming to the expectations, which were made in formulating hypotheses 4a and 4b, in model 4, the effect of a unit increase in the RQI increases the log odds of being present with 0.197. The effect is, however, non-significant. In 7 and 8, the effect of regulatory quality becomes considerably stronger, now displaying an increased log odds of being present of 0.374 and 0.373 respectively. Corresponding to an OR of approximately 1.45, these results indicate that the odds of being present with upstream FDI increases with 45% for every one unit increase in the RQI. These results are also significant at the 5% level.

The results provided in model 5 show that a one unit increase in the perceived degree of corruption decreases the log odds that multinational petroleum companies are present with upstream investment FDI, with -0.091. The result, which although non-significant, thus suggests that a one unit improvement in the perceived level of corruption (remember that higher values indicate less corruption) is accompanied with a reduction of the odds of being present of nearly 9% (OR =0.91). When analysed together with the other political risk indicators in model 7 and 8, the tendency depicted in model 5 becomes considerably stronger. While now also significant at the 1% level, the result in model 7 and 8 shows that an improvement of one unit on the corruption perception scale, reduces the log odds of being present with -0.746, corresponding to an odds of almost 53% (OR = 0.47).

Besides reporting regression coefficients and standard errors, table 4.1 also displays a variance estimator for each model. Representing an expression of the conditional intraclass correlation (ICC), in this analysis, *rho* is a measure of how much of the variation in the dependent variable that can be explained by variation between companies (Rabe-Hesketh and Skrondal 2008: 249).[26] As there is no clear cut-off point, above which the ICC is considered to be high enough to make multilevel modelling preferable to traditional single-level regression, any judgment concerning the suitability of multilevel modelling as opposed to traditional logistic regression is necessarily rather arbitrary. However, with approximately 9-16% of the variation in upstream investment patterns being caused by variation between companies, it seems that fitting a multilevel model is warranted.

To assess the goodness-of-fit of the models fitted in the preliminary analysis, I have included two summary statistics to measure whether the logistic multilevel regression models are adequate in describing the data. The first of these statistics is the log likelihood, which takes on higher values for more properly fitted models. As shown in table 4.1, model 7 has the highest log likelihood value. When compared with model 6, which is nested within model 7, the improvement in fit also turns out as significant.[27] Similar tests between model 8 and model 6 do, on the other hand, indicate that model 8 is too complex relative to its power. While suggesting that measures should be taken to reduce the complexity, since the difference

[26] Stating the same, a common way of explaining the intraclass correlation is that the intraclass correlation is an expression of ”the degree of dependence of individuals [host countries] upon a higher structure [company investment portfolios] to which they belong” (Hox 2011: 220).

[27] This result is obtained by conducting a likelihood ratio test, in which the difference in log likelihood values of nested models is compared based on chi square statistics.

between the two log likelihood values is not statistically significant, I will tolerate this for now.

Further evaluating the goodness-of-fit, table 4.1 also reports the Akaike Information Criteria (AIC), which takes on lower values for more properly fitted models.[28] Being based on the log likelihood value, the AIC parts from the log likelihood function, in that it punishes models with higher complexity. As shown in table 4.1, model 7 has the lowest value, which indicates that the inclusion of the PIW2 indicator increases the explanatory power more than it increases the complexity. For model 8, the AIC value indicates poorer fit, which in light of the previous evaluations, is not at all surprising.

4.1.1 Regression diagnostics

As displayed in table 4.1, some of the political risk sources are either non-significant or their effects indicate weak or even positive relationships between political risk and the odds of being present with upstream FDI. Given the theoretical framework, these unexpected results should lead us to question whether the conditions, which the logistic multilevel regression model rests upon, are in any way violated. As mentioned in the previous chapter, when analysing binary dependent variables, assumptions about the distribution of the residuals need to be less restricted when compared to ordinary least square regression. However, similar to the assumptions underlying OLS regression, the logistic regression model assumes 1) adequate measurement, 2) independence of observations/residuals, 3) non-influence of confounding variables and 4) absence of perfect or substantial multicollinearity (Menard 2010: 125). Since the first three assumptions have been thoroughly treated in the previous chapter they will not be discussed here. This leaves us to explore whether or not the results are inflated by multicollinearity, which is a situation where "the independent variables are correlated with one another" (ibid.: 126).

So far treated as distinct sources of political risk, there are, however, reasons to suspect that multicollinearity may be present within the data material. First, since several of the phenomena, of which the independent variables represent operationalisations, do tend to occur simultaneously, correlations among the independent variables are likely to be persistent. Second, as three out of five risk variables originate from the same source, similarity in coding

[28] AIC = 2*K – 2*LL, where K is the number of independent variables and LL the likelihood function.

procedures may, unintended, cause correlation when entered into the same model. The results provided by correlation analyses show that one pair of indicators correlate more than 0.80, with the RQI and CCI displaying correlation of 0.82.[29] For the remaining variables, the correlation values do not raise serious concerns about severe multicollinearity, as most display moderate correlations, not exceeding 0.60.

Although able to provide suggestions about the presence of multicollinearity, correlations do not reflect the entire cause of multicollinearity, as more than two independent variables may be jointly correlated. To address the potential problem of multicollinearity the correlation values are thus complemented with the Variance Inflation Factor (VIF), which measures each independent variables´ effect on the other coefficients´ variances and standard errors (Hamilton 2009: 226). As illustrated by table 4.2, as expected, the variables that exhibit the highest correlations also have to have the highest VIF value, with both RQI and the CCI displaying VIF values above four. Of the other variables, the HDI and the LN_PGASRES also display VIF values that may cause some concern, with both having VIF values above three.[30]

Table 4.2 VIF values of model 7 and 8

Variable	Model 7	Model 8
cci	5.08	5.08
rqi	4.17	4.17
ln_pgasres	3.30	3.30
hdi	3.12	3.12
psi	2.62	2.62
wto	2.03	2.03
ln_poilres	2.01	2.01
ln_population	1.84	1.84
fhi_rev	1.84	1.84
ln_inflation	1.75	1.75
piw2	1.00	
s_ownship2		1.00

[29] The results are depicted in appendix D.
[30] To date, scholars have not yet reached an agreement on a VIF value, above which multicollinearity is perceived to be persistent enough to justify deletion or other alterations of the variable matrix. Any judgments about the scope of multicollinearity based on VIF values should thus be treated with caution.

4.1.2 Robustness and sensitivity tests

Do the results provided in model 7 and 8 hold when the variable matrix is altered or if the models are respecified? This is the question which robustness tests seek to answer. In the attempt to answer the question two robustness tests are deployed. First, I apply a sensitivity test, where variables are removed from the variable matrix. Second, to exclude that the results are the product of the chosen estimation technique, the data material is analysed using alternative estimation techniques.

As shown in table 4.1, the HDI displays a dramatic shift in direction when included in model 7 and 8. Estimating the opposite effect of human development than expected, the coefficient is also turning out as non-significant in both models. According to Gelmann and Hill (2007: 69), "if a predictor is not statically significant and does not have the expected sign, [one should] consider removing it from the model". Based on this, model 7 and 8 are thus refitted, now excluding the HDI. The results from these models are shown in model R1 and R2 in table 4.3.

Revealed by the regression diagnostics, the RQI and the CCI are highly correlated with each other. As high correlations between independent variables deprive models of power while also leading to increased complexity, these results merit some further investigation. Thus, to test whether the results, displayed in model 7 and 8, are severely affected by the high correlation between the RQI and CCI, in table 4.2 the RQI is, in turn, excluded from model 7 and 8.

Finally, to test whether the results yielded in model 7 and 8 are contingent on the chosen estimation technique, two respecifications are made. In model R5 and R6, model 7 and 8 are respecified, using a non-hierarchical logistic model with clustered standard errors. By adding the cluster option, the model should be able to handle structured data without having to resort to multilevel modelling. Furthermore, as petroleum companies have been assigned to the group level (level 2), in model R7 and R8 the results provided in table 4.1 are checked by reversing the hierarchical order.

Table 4.3 Results from robustness and sensitivity tests

	Model R1	Model R2	Model R3	Model R4	Model R5	Model R6	Model R7	Model R8
fhi_rev	0.109*	0.109*	0.133**	0.133**	0.103	0.098	0.103	0.098
	(0.056)	(0.056)	(0.059)	(0.059)	(0.069)	(0.066)	(0.075)	(0.069)
psi	0.280**	0.279**	0.317**	0.317**	0.263**	0.251**	0.257*	0.245*
	(0.114)	(0.114)	(0.128)	(0.128)	(0.107)	(0.103)	(0.152)	(0.145)
hdi			-0.036	-0.036	-0.007	-0.004	-0.036	-0.034
			(0.938)	(0.938)	(0.850)	(0.812)	(1.111)	(1.060)
rqi	0.374**	0.373**			0.350**	0.333*	0.362	0.343
	(0.187)	(0.187)			(0.188)	(0.177)	(0.225)	(0.214)
cci	-0.747***	-0.746***	-0.428**	-0.428**	-0.698***	-0.664***	-0.705**	-0.669**
	(0.251)	(0.251)	(0.196)	(0.196)	(0.247)	(0.235)	(0.303)	(0.288)
piw2	-1.129***		-1.124***		-1.047***		-1.070***	
	(0.452)		(0.303)		(0.283)		(0.144)	
s_ownship2		-0.019		-0.019		-0.086		-0.088
		(0.361)		(0.359)		(0.296)		(0.141)
ln_poilres2	0.157**	0.157**	0.153**	0.153**	0.148**	0.141**	0.147**	0.140**
	(0.045)	(0.045)	(0.065)	(0.065)	(0.067)	(0.065)	(0.078)	(0.074)
ln_pgasres2	0.055	0.055	-0.046	-0.046	0.051	0.049	0.051	0.048
	(0.066)	(0.066)	(0.068)	(0.068)	(0.064)	(0.061)	(0.081)	(0.77)
ln_inflation	0.327***	0.327**	0.242**	0.242**	0.308**	0.294**	0.311**	0.296**
	(0.122)	(0.122)	(0.115)	(0.115)	(0.131)	(0.122)	(0.146)	(0.139)
ln_population	0.132**	0.132**	0.144***	0.144***	0.124**	0.118**	0.126**	0.120**
	(0.056)	(0.056)	(0.053)	(0.053)	(0.059)	(0.057)	(0.063)	(0.060)
wto	-0.122	-0.122	-0.154	-0.154	-0.115	-0.110	-0.129	-0.122
	(0.215)	(0.215)	(0.220)	(0.220)	(0.188)	(0.179)	(0.264)	(0.252)
cons	-2.170***	-2.992***	-2.024**	-2.842***	-2.035**	-2.645***	-2.072**	-2.689***
	(0.452)	(0.437)	(0.809)	(0.800)	(0.829)	(0.738)	(0.927)	(0.883)
N	1248	1248	1248	1248	1248	1248	1248	1248
Groups	26	26	26	26			45	45
rho	0.098	0.160	0.097	0.159			0.030	0.024
log likelihood	-640.505	-646.480	-642.981	-648.489	-659.143	-685.689	-656.976	-684.030
AIC	1305.082	1316.962	1309.838	1320.979	1342.281	1395.379	1339.953	1394.062

* p<0.10 ** p<0.05 *** p<0.01

As shown in table 4.3 the robustness tests seem to conform to previous findings. In model R1 and R2, when HDI are excluded from the model 7 and model 8 respectively, the effects are fairly consistent with the ones displayed in table 4.1. This suggests that the HDI, regardless of its lack of significance and unexpected sign, does not seriously obscure the results depicted in model 7 and 8.[31] While still significant at the 10% and 5% level respectively, the reversed

[31] The results from likelihood ratio tests show no significant improvement in model fit when HDI is excluded.

FHI and the PSI are still exerting positive, albeit somewhat weaker effect on the odds that multinational petroleum companies are present with upstream FDI. Furthermore, the CCI is still negative and significant at the 1% level. Finally, the RQI is, as before, significant at the 5% level and exhibits strength identical to the ones displayed in model 7 and 8.

Having removed the RQI, in model R3 and R4, the results for the reversed FHI and PSI are relatively consistent with previous findings. In similar fashion, a unit change in the HDI still reduces the odds of being present with upstream FDI. The effect is, however somewhat stronger. Moving on to the effect of the CCI, the result displayed model R3 and R4 conforms to the result displayed in table 4.1, as a unit improvement in the CCI is still exerting negative influence on the odds of being present with upstream FDI. However, now only significant at the 5% level, the effect is also weaker, which indicates that the correlation, which was revealed by the diagnostics, does, to a certain degree, obscure the measured effect of corruption. Regardless of this, however, because removing the RQI from model 7 and 8 does not lead to a significant improvement in the model fit, and that the two variables display opposite signs, in subsequent analyses the RQI is therefore re-included.[32]

The results from altering the estimation technique are generally consistent with earlier findings. In model R5 and R6 the results from fitting a logistic model with clustered standard are displayed. While most of the effects are generally somewhat weaker than in model 7 and model 8, they do general appear to be just as significant and with identical signs as depicted in table 4.1. Furthermore, as shown by the AIC values, model 7 and model 8 seem to be the most properly fitted models, since both model R5 and R6 display higher values.

Proceeding to model R7 and R8, in which the hierarchical order is revered, the effects are, just as in the model R5 and R6, somewhat weaker than in model 7 and 8. More important, however, is the fact that many of the significant variables experience a drop in the significance levels when compared to model 7 and model 8. As it is generally assumed to be better to enhance the number of higher order observations, from these results we might then conclude that it would be better to turn the hierarchical order around. However, as revealed by the AIC, model 7 and 8 display lower values, indicating better fit.

[32] While the former argument is technical, the latter suggests that there might be some different mechanisms at play when comparing the effect of regulatory quality and corruption. Hence, excluding RQI would be at the risk of loosing out on important knowledge.

4.2 Main analysis 1: Company size

In the second section of the analysis, model 7 from the preliminary analysis is extended with interaction terms between the PIW2 indicator and the political risk variables. To avoid overly complex models and problems with interpreting the coefficients, only one interaction term is included in each model. As before, in the effects are reported in logits, with coefficients being transformed to OR when commenting on the results. To be able to assess and compare the models with interaction terms with model 7, the log likelihood function and the AIC are also reported. While the target of the upcoming analyses is to analyse if company size and state ownership can moderate the effect of political risk, in the following analyses, I will only comment on the political risk coefficient and the interaction term. Given the symmetry that characterise interaction terms, analysing only one side of the term should not cause serious problems with the interpretation of the effects.

Table 4.4 Results from main analysis 1

	Model IP1	Model IP2	Model IP3	Model IP4	Model IP5
fhi_rev	0.154*	0.110*	0.110*	0.112*	0.111*
	(0.086)	(0.061)	(0.061)	(0.061)	(0.061)
psi	0.280**	0.457***	0.282**	0.282**	0.280**
	(0.129)	(0.172)	(0.129)	(0.129)	(0.129)
hdi	-0.020	-0.004	1.608	-0.039	-0.015
	(0.942)	(0.938)	(1.226)	(0.940)	(0.939)
rqi	0.373**	0.374**	0.374**	0.593***	0.374**
	(0.187)	(0.187)	(0.188)	(0.229)	(0.187)
cci	-0.745***	-0.751***	-0.757***	-0.752***	-0.562*
	(0.253)	(0.305)	(0.255)	(0.254)	(0.299)
piw2	-1.121***	1.119***	-1.123***	-1.118***	-1.130***
	(0.304)	(0.305)	(0.306)	(0.305)	(0.304)
piw2_fhi_rev	**-0.067**				
	(0.094)				
piw2_psi		**-0.271**			
		(0.172)			
piw2_hdi			**-2.452****		
			(1.165)		
piw2_rqi				**-0.336***	
				(0.200)	
piw2_cci					**-0.285**
					(0.248)
ln_poilres	0.157**	0.159**	0.159**	0.158**	0.158**
	(0.065)	(0.065)	(0.066)	(0.065)	(0.045)
ln_pgasres	0.056	0.053	0.054	0.055	0.054
	(0.068)	(0.068)	(0.068)	(0.068)	(0.068)
ln_inflation	0.327***	0.327***	0.328***	0.325***	0.324***
	(0.123)	(0.124)	(0.124)	(0.123)	(0.123)
ln_population	0.132**	0.134**	0.133**	0.133**	0.133**
	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)
wto	-0.121	-0.130	-0.128	-0.131	-0.126
	(0.220)	(0.220)	(0.220)	(0.220)	(0.220)
cons	-1.824	-2.357***	-2.185***	-2.354***	-1.721
	(0.867)	(0.793)	(0.453)	(0.830)	(0.781)
N	1248	1248	1248	1248	1248
Groups	26	26	26	26	26
Rho	0.098	0.098	0.099	0.098	0.098
log likelihood	-640.653	-639.655	-638.661	-639.501	-640.246
AIC	1309.308	1307.311	1305.323	1307.003	1308.493

* p < 0.10 ** p < 0.05 *** p < 0.01

In so fare as company size represents an effect modifier of political risk, the results in table 4.4 are somewhat discouraging. In model IP1, there is a positive, albeit weak effect of political regime on the log odds of being present with upstream investment among the super majors (PIW2 = 0). For these companies, a one unit increase in the FHI increases the log odds of being present with upstream FDI with 0.154, which is equal to an increased odds of 16 %. Moving on to the effect of political regime on the log odds of being present with upstream FDI for the smaller petroleum companies (PIW2 = 1), there is a tendency towards smaller companies being less sensitive to the degree of democracy when compared to the super majors. For smaller companies a one unit increase in the reversed FHI is leading to an increased log odds of being present with upstream FDI of 0.154 + (-0.067) = 0.087, equalling an odds of 9%.

As shown in model IP1, the reversed FHI, and PIW2 index display significant effects at the 10% and 0.01% level respectively. The interaction term is, however, non-significant. To test whether the three variables are jointly significant, that is, that they are not all simultaneously 0, I therefore conduct an F-test.[33] With a joint p-value of 0.0006 we cannot reject the hypothesis that the reversed FHI, the PIW2 and the interaction term are jointly significant. However, as the interaction term is extremely weak and non-significant, it appears to be contingent support for rejecting hypothesis 1a.

Analysing whether company size represents an effect modifier on the effect of political instability, in model IP2 there is a moderate, positive effect of increased political stability among the super majors. Among these companies, a one unit increase in the level of political instability (remember that higher values are given to countries with more stability) increases the log odds of being present with upstream FDI with 0.457, which transforms to an increased odds of being present of 58%. For the smaller companies, the effect of political instability is, somewhat surprisingly, weaker, with the inclusion of the interaction term resulting in a moderated effect of political instability of 0.457 + (-0.271) = 0.186. Transformed back to odds, the result means that the odds of being present with upstream FDI among the smaller companies increases with 20% for every one unit reduction in the level of political instability.

As can been seen in model IP2, the interaction term is non-significant. The variables in model IP2 are thus subjected to an F-test to check if they are jointly significant. Similar to earlier

[33] For more information about F-tests and their syntaxes, see Long and Freese (2006: 99-101).

findings, the test provides positive results (p = 0.0001), which suggest that the findings cannot be ruled out as significant. The results thus seem to undermine the assumptions made in formulating hypothesis 2a, which in light of these findings, is weakened. It should be noted, however, that since the interaction term is non-significant generalisations based on this result should be made with caution, as it only provides contingent support for rejecting hypothesis 2a.

In model IP3, the super majors and the smaller companies part from each other, as there is a change of direction when the smaller petroleum companies are compared to the super majors. While the effect of a unit increase in the HDI is strongly positive (1.608) among the super majors, for the smaller companies, there is a strong negative effect of 1.608 + (-2.452) = -0.844 following a unit increase in the level of human development. Corresponding to OR of 4.99 and 0.40 respectively, according to these results, for the super majors, the odds of being present with upstream FDI increases with 399% for every unit increase in the HDI, whereas for smaller petroleum companies the identical increase in the level of human development lowers the odds of being present with 60%. Being jointly significant (p = 0.0004), these results speak strongly against hypothesis 3a, as the presence of upstream FDI of smaller companies, in fact, seem to be discouraged by higher levels of human development. The effect of human development is, however, non-significant among the super majors, which cast some doubt on the relevance of the HDI in explaining the presence of upstream FDI within the petroleum industry.

The results from model IP4 show that among the super majors, a one unit increase in the perceived level of regulatory quality increases log odds of being present with upstream FDI of 0.593. Corresponding to an OR of 1.81, this means that, for the largest companies, a one unit improvement in the RQI would increase the odds of being present with upstream FDI with 81%. Turning to the interaction term, it displays a moderately negative effect, which contrary to hypothesis 4a, entails that for the smaller companies, an increase of one unit on the regulatory quality index is associated with an increased log odds of only 0.593 + (-0.336) = 0.257. Thus, for smaller companies, the odds of being present with upstream FDI increase with only 29% for every unit improvement in regulatory quality. As before, the variables are jointly significant, with a p-value of 0.0005. Suggesting that smaller companies are more likely to invest in countries with lower regulatory quality than larger companies, the findings in model IP4 thus seem to reject hypothesis 4a.

In model IP5, the interaction between corruption and company size is analysed. For the super majors, a one unit increase on the CCI decreases the log odds of being present with upstream FDI with -0.562. As higher values on the CCI are assigned to countries with lower levels of corruption, this means that a one unit improvement in the level of corruption reduces the odds of being present with upstream FDI of 44% among the super majors. Considering the effect of corruption among the smaller companies, the negative effect is, contrary to hypothesis 5a, stronger for smaller companies when compared to the super majors. With a one unit improvement in the level of corruption now leading to a reduced log odds of being present with upstream of (-0.562) + (-0.285) = -0.847, the result shows that, for smaller companies, the odds of being present with upstream FDI decreases with 57% for each unit of improvement in the control of corruption. Jointly significant at the 0.01% level, these results appear to reject hypothesis 5a. However, as the interaction term is non-significant, caution is warranted when generalisations are made based on the findings in model IP5.

Indicating poorer fit, the log likelihood values of model IP1 and IP5 are both lower than the corresponding value in model 7. Submitted to likelihood ratio tests, as expected, model IP1 and IP5 fail to deliver significant improvements, a result most likely caused by the lack of significance of the interaction term. While the result for model IP2 indicates a non-significant improvement, for model IP3 and IP4, the inclusion of the interaction term yields significant improvements, albeit only at the 5% and 10% level respectively. Considering the AIC, the picture repeats itself as only model IP2, IP3 and IP4 display lower values than the baseline model. These differences do, on the other hand, only indicate marginal improvements. How should we go around with these results then? From a technical perspective, the lack of improvement when comparing model IP1, IP2 and IP5 to model 7 does, to some degree, indicate overfitting, in which the explanatory power does not increase with the relatively higher complexity introduced by the inclusion of the interaction term. While perhaps leading to the conclusion that the results from these models should be disregarded, as I find even non-significant interaction terms to be of substantial interests, I believe, as they are all jointly significant, that it would be unfortunate to disregard the findings all together. Nevertheless, given the relatively weaker test, provided in testing for joint significance, a warning against too bombastic generalisations is thus warranted.

4.3 Main analysis 2: State ownership

In the second analysis the interactions between state ownership and political risk is investigated. As mentioned in the previous chapter the original ownership variable, which is measuring the percentage of the shares that are owned by the state, is recoded into a new variable, S_OWNSHIP2. Separating petroleum companies with more than 50% state ownership (1) from those companies, in which the state owns less than half of the shares (0), the values on the new variable, are multiplied with the five political risk indicators. The results from the second analysis are depicted in table 4.5.

Table 4.5 Results from main analysis 2

	Model IS1	Model IS2	Model IS3	Model IS4	Model IS5
fhi_rev	0.218***	0.115*	0.111*	0.116*	0.118*
	(0.069)	(0.061)	(0.069)	(0.061)	(0.061)
psi	0.283**	0.494***	0.285**	0.285**	0.279**
	(0.130)	(0.147)	(0.130)	(0.130)	(0.130)
hdi	-0.058	-0.007	1.645	-0.093	0.018
	(0.946)	(0.945)	(1.063)	(0.948)	(0.945)
rqi	0.382**	0.370**	0.375**	0.715***	0.383**
	(0.188)	(0.188)	(0.188)	(0.206)	(0.188)
cci	-0.751***	-0.764***	0.764***	-0.765***	-0.412
	(0.254)	(0.255)	(0.255)	(0.256)	(0.266)
s_ownship2	-0.004	-0.014	-0.018	-0.027	-0.070
	(0.364)	(0.364)	(0.366)	(0.366)	(0.365)
s_ownship2_fhi_rev	**-0.314*** **				
	(0.096)				
s_ownship2_psi		**-0.579*** **			
		(0.175)			
s_ownship2_hdi			**-4.320*** **		
			(1.153)		
s_ownship2_rqi				**-0.927*** **	
				(0.210)	
s_ownship2_cci					**-1.089*** **
					(0.276)
ln_poilres2	0.160**	0.159**	0.154**	0.168**	0.159**
	(0.066)	(0.066)	(0.066)	(0.066)	(0.066)
ln_pgasres2	0.057	0.055	0.057	0.049	0.052
	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)
ln_inflation	0.330***	0.327***	0.332***	0.330***	0.323***
	(0.124)	(0.124)	(0.124)	(0.125)	(0.124)
ln_population	0.131**	0.136**	0.138***	0.139***	0.141***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)
wto	-0.119	-0.130	-0.132	-0.144	-0.144
	(0.221)	(0.222)	(0.222)	(0.223)	(0.222)
cons	-2.649***	-3.232***	-3.046***	-3.191***	-2.601**
_	(0.862)	(0.790)	(0.441)	(0.831)	(0.777)
N	1248	1248	1248	1248	1248
Groups	26	26	26	26	26
Rho	0.163	0.163	0.165	0.164	0.163
log likelihood	-640.971	-640.927	-639.393	-636.277	-638.034
AIC	1309.942	1309.854	1306.788	1300.556	1304.069

* p < 0.10 ** p < 0.05 *** p < 0 .01

As illustrated by the results in model IS1, state ownership does seem to have the potential to modify the effect of political regime. First of all, the coefficient for the reversed FHI tells us that, for private companies, an increase of one unit on the reversed FHI is associated with increased log odds of being present with upstream FDI of 0.218. Equal to an OR of 1.24, this means that for private companies, the odds of being present with upstream FDI increases with 24% for every one unit increase on the reversed FHI. Considering the effect of political regime for state owned companies, a one unit increase in the democracy indicator results in an log odds of being present with upstream FDI of 0.218 + (-0.314) = -0.096. Corresponding to an OR of 0.90, this means that for state owned companies, there is a negative, albeit weak effect of higher levels of democracy, as the odds of being present with upstream FDI decreases with around 10% following a unit improvement in the reversed FHI. Being jointly significant at the 0.01% level, the result from model IS1 thus seems to offer support for hypothesis 1b.

According to the results provided in model IS2, state ownership almost eliminates the effect of political instability. Whereas the log odds of being present with upstream FDI increases with 0.494 for every one unit increase in the PSI among the private petroleum companies, for state owned petroleum companies the corresponding log odds is only 0.494 + (-0.579) = -0.085. Transformed into OR then, for private petroleum companies the odds of being present with upstream FDI increases with 64% for every unit improvement in political stability. For state owned companies the effect is weakly negative, with the odds of being present decreasing with around 8% following a unit increase in the PSI. As in model IP1, the results generated in model IS2 are jointly significant, indicating further support for hypothesis 2b.

Following the pattern established in the previous models, in model IS3, the effect of human development is, to a considerable degree, reversed by state ownership. While there is a strong positive effect of a unit increase in the HDI among private petroleum companies (1.645), for state owned petroleum companies, there is a considerable change of direction, with a log odds of 1.645 + (-4.320) = -2.675: equalling an decreased odds of being present with upstream FDI of 93% succeeding a one unit increase in the HDI. Being jointly significant at the ($p = 0.0028$), the findings in model IS3 thus seem to offer support for hypothesis 3b. However, it should be noted, that for private companies, the effect of the HDI is non-significant, resulting in only contingent support for hypothesis 3b.

As displayed in model IS4, for private companies, a one unit increase in the RQI causes an increase in the log odds of being present with upstream FDI of 0.715. In other words, for private petroleum companies, the odds of being present increases with around 104% for every unit increase in the regulatory quality. Moving on to consider the effect of regulatory quality for state owned companies, the effect of the RQI runs in the opposite direction, with an increase in the RQI of one unit now leading to a reduction of the log odds of being present with upstream FDI of 0.715 + (-0.927) = -0.212. Decreasing the odds of being present with upstream FDI with around 20% among state owned petroleum companies, the results in model IS4 are also jointly significant (p = 0.0000), which adds weight to hypothesis 4b.

In model IS5, the interaction between corruption and state ownership is analysed. Conforming to the results from the preliminary analysis, when analysing the effect of corruption among private petroleum companies, the results in model IS5 show that a one unit increase in the CCI (remember that higher values equal less corruption) reduces the log odds of being present with upstream FDI, with -0.412. In other words, the odds of being present decrease with around 36% for every one unit improvement in the control of the corruption for private petroleum companies. For state owned companies the negative effect of less corruption is, somewhat, surprisingly, considerable stronger. Here, the log odds of being present with upstream FDI decreases with -0.412 + (-1.089) = - 1.501 following a unit increase in the CCI (the odds is accordingly decreasing with 77%). Although jointly significant (p = 0.0000), because only the interaction term is significant, the results from model IS5 can only offer contingent support for hypothesis 5b.

Similar to the first analysis, summary statistics are reported in table 4.5. As shown by the log likelihood value, most models display higher values than model 8 from the preliminary analysis, indicating improved fit following the inclusion of interaction terms. The results from the likelihood ratio tests also show that these improvements are significant. Moving on to the AIC, the results are somewhat encouraging, as all models display lower values than the model 8. Given that the AIC punishes more complexity, from these results then, it appears, that the inclusion of interaction terms increases the explanatory power sufficiently enough to offset the somewhat higher complexity introduced by the interaction terms.

4.4 Regression diagnostics

As the main analyses have resulted in some unexpected and, at times, contingent findings, regression diagnostics are conducted to check if the assumptions, which the logistic multilevel model rests upon, are violated. Similar to the regression diagnostics in the preliminary analysis, the first diagnostics to be deployed here is a control of multicollinearity. Furthermore, dealing with heterogeneous observation units, such as states and companies, there are reasons to assume that some observations will deviate from the general trend. As such observations may obscure the coefficients and the standard errors, thereby leading to invalid results, measures will be taken to identify these observations and to analyse their effects.

4.4.1 Multicollinearity

To evaluate the impact of multicollinearity the Variance Inflation Factor (VIF) is reported for each model in table 4.6 and table 4.7. As depicted in table 4.6, in model IP1 to IP5, multicollinearity between the interaction term and the included variables is present, with all political risk variables displaying VIF values exceeding four, and with VIF values exceeding six in model IP4 and model IP5. Due to high correlations between RQI and CCI (see table 4.1), in model IP4 and IP5, the VIF values are somewhat lower when these variables, in turn, are excluded from model IP5 and IP4 respectively (the results are displayed in model IP4.1 and model IP5.1).

Table 4.6 VIF values for model IP1-IP5

	Model IP1	Model IP2	Model IP3	Model IP4	Model IP5	Model IP4.1	Model IP5.1
fhi_rev	4.55						
psi		5.33					
hdi			5.84				
rqi				6.89		5.11	
cci					7.79		5.63
piw2	1.00	1.00	1.00	1.00	1.00	1.01	1.00
piw2_fhi	3.72						
piw2_psi		3.72					
piw2_hdi			3.71				
piw2_rqi				3.72			
piw2_cci					3.71	3.72	3.71

Moving on to model IS1 to IS5, the reported VIF values are provided in table 4.7. As seen in table 4.7, in model IS1 to IS3 the VIF values for the political risk coefficients are all below four. However, in similar fashion as in table 4.6, the level multicollinearity increases when models including the RQI and CCI are being analysed. To control for the additional multicollinearity that stems from the bivariate correlation between these two variables, model IS4 and IS5 are refitted, in turn excluding each variable (the corresponding VIF values are depicted in model IS4.1 and IS5.1). As before, the level of multicollinearity between the interaction term and the subcomponents becomes lower when the two variables are, in turn, removed from the analysis.

Table 4.7 VIF values for model IS1-IS5

	Model IS1	Model IS2	Model IS3	Model IS4	Model IS5	Model IS4.1	Model IS5.1
fhi_rev	2.37						
psi		3.15					
hdi			3.65				
rqi				4.70		2.93	
cci					5.61		3.45
s_ownship2	1.00	1.00	1.00	1.00	1.00	1.01	1.00
s_ownship2_fhi	1.53						
s_ownship2_psi		1.53					
s_ownship2_hdi			1.53				
s_ownship2_rqi				1.53			
s_ownship2_cci					1.53	1.53	1.53

As illustrated in table 4.6 and 4.7, multicollinearity is by all means present within the data material. To check if the degree of multicollinearity is high enough to seriously undermine the validity of the results provided in table 4.4 and 4.5 I have refitted all models, now centering PIW2 and S_OWNSHIP2.[34] The results from these models show that the degree of multicollinearity between the interaction term and the included variables does become lower when centering both of the higher order variables. However, as the results from table 4.4 and 4.5 are generally reproduced, sacrificing meaningful interpretation for marginally better precision seems futile. Similarly, when the RQI and the CCI are, in turn removed from the analyses, the results conform to earlier findings. Hence, it does appear that the multicollinearity does not pose a serious threat against the validity of the results.

[34] For VIF values with centered level-2 variables, see appendix E.

4.4.2 Influential observations

While there are several formal procedures to identify influential observations in non-hierarchical regression models, the same cannot be said to be the case when conducting residual analyses in multilevel modelling. According to Snijders and Bosker (1999: 128) the basic problem when it comes to residual analysis in multilevel modelling, is that, the "level-one residuals can be estimated so that they are unconfounded by the level-two residuals, but the other way around is impossible".[35] Based on this they thus recommend an upward approach, in which level-1 residuals are analysed within each group before moving on to analyses of level-2 residuals. Leading us through these procedures Snijders and Bosker (ibid.: 134-135) present calculations, which ultimately lead to an adjusted Cook's D. As calculating the adjusted Cook's D for every higher order observation is outside the scope of this analysis, I will apply a hybrid approach, in which formal diagnostics measures, such as the Cook's D, is used to identify influential level-1 observations. The influence of the level-2 observations is, on the other hand, investigated by comparing the effect and the significance of the interaction terms and their subcomponents, having in turn, deleted level-2 observations from the analyses. As deleting all companies from all models would entail a considerable number of models to be fitted, the selection of level-2 observations to be deleted will be based on theoretical considerations.

Level-1 observations

Before moving on to analysing the influence of the level-1 observations, it is important to have in mind that scholars have not yet reached an answer to how much influence is too much influence.[36] Any cutoff point, above which the observations are either removed from the sample or submitted to further investigation, is thus somewhat arbitrary. In figure 4.1, a scatterplot connecting the host country identification variable (ID) with the Cook's d, is depicted.[37] As seen from the scatterplot there appear to be seven countries that exert some degree of influence on the parameter estimates. Having identified these observations as Algeria (1), Colombia (12), Egypt (15), Libya (25), Nigeria (30), Russia (37) and Saudi

[35] Because multilevel models have more than one type of residual, according to Hilden-Minton (1995: 47-49) it becomes more difficult to identify the "pure" disturbance that is generated by the residuals.
[36] For a more thorough debate over numerical cutoffs, see Fox (1991: 32).
[37] Given that the same countries are measured within each group, the unconfounded residuals are the same within all groups.

Arabia (38), the influence of these observations is investigated by, in turn, removing each country from model IP1-1P5 and from model IS1-IS5.[38]

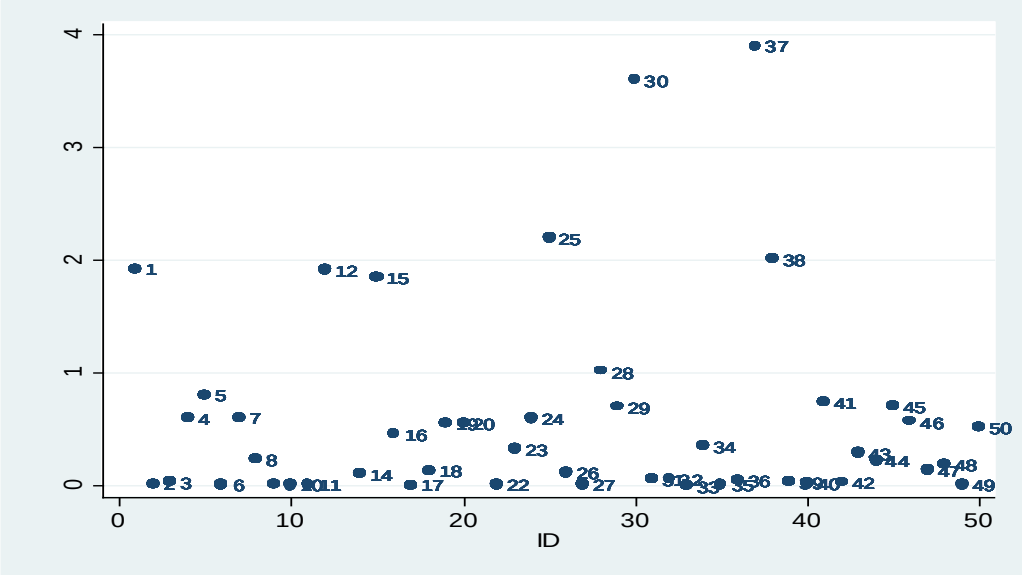

Figure 4.1 Influential level-1 observations

Mainly exerting its influence in model IS5, when Algeria is removed from the sample, the effect of corruption becomes stronger and significant among the private petroleum companies. With a score on the CCI of -0.4, Algeria is located among the 25% least corrupted countries in the sample. At the same time, Algeria is host to nine of the 17 private companies. As such, Algeria is apparently working against the general trend, exerting positive pressure on the negative CCI coefficient.

Having removed Colombia from the sample in model IP2, the interaction term now becomes somewhat stronger and significant (albeit at the 10% level only). Oppositely, when Colombia is removed from the sample in model IP4, the interaction term becomes weaker and non-significant. Most notable, however, is the effect of suspending Colombia when considering the effect of corruption. In both IP5 and IS5, the effect of corruption becomes stronger and significant among the super majors and the private companies respectively. A short glance at the numbers reveals that Colombia, with a relatively low degree of corruption (-0.19) is host to five of seven super majors, while also hosting a majority of the private petroleum companies. From this then, it appears that Colombia goes against the general trend, where

[38] For overview of main findings, see appendix F.

lower levels of corruption is negatively correlated with the presence of super majors and private companies.

Although leading to a somewhat weaker and less significant effect of political instability among the super majors in model IP2, the exclusion of Libya leads to a stronger and significant interaction effect (albeit at the 10% level only). Taking a look at the PSI value of Libya, it is assigned with a value of 0.58, which makes Libya the fourth most stable country in the sample (!). Hosting 16 of the companies in the sample, of which four out of the seven super majors are present, Libya thus seems to gain its influence as a most likely case, where more stability leads to increased odds of being present with upstream FDI. Moving on to model IP4, removing Libya from the sample results in a weaker and less significant effect of regulatory quality among the super majors. Furthermore, the interaction effect turns out as non-significant. With a RQI value of -1.03, Libya is placed among the lowest 50% of the countries. Given the presence of 16 multinational petroleum companies, in model IP4, Libya stands out at as something close to a least likely case.

According to the results in table 4.7, Nigeria predominately exerts its influence, representing a least likely case in model IP3 and IS3. Assigned with a HDI value of 0.511, the third lowest in the sample, the country, nevertheless, hosts 15 of the petroleum companies included in the sample. Of these, six count as super majors. Following from this, when Nigeria is removed from the sample in model IP3 and IS3, there is a marked shift in the effect of human development, with the effect of the HDI among the super majors, respectively the private petroleum companies, now appearing both stronger and significant.

Predominately exerting influence in model IP5 and IS5, when Russia is removed from the sample, the effect of corruption among the largest and the private companies becomes somewhat stronger. In model IP5, the effect of corruption for the super majors is now turning out as significant at the 0.1% level. The interaction effect is, on the other hand, still non-significant. In model IS5, the effect of corruption among the super majors becomes somewhat stronger when Russia is removed from the sample. Moreover, the effect is now significant at the 5% level. Again turning to the data to find some explanations, Russia is assigned with a CCI score of -0.91. This renders Russia among the 25% most corrupt host countries in the sample. Hosting eight multinational petroleum companies, of which four are categorised as super majors, it thus seems inevitable that removing Russia from the sample will yield stronger effect for the super majors.

Being located among the 25% most developed countries in the sample (HDI = 0.843) and with only three private companies being present with upstream FDI, when removing Saudi Arabia from the sample in model IS3, not surprisingly, the effect becomes stronger and more significant among the private companies. Similarly, in model IS5, the removal of Saudi Arabia results in a stronger and now significant effect of corruption for the private petroleum companies. With a corruption score, which firmly place Saudi Arabia among the 25% most corrupted countries in the sample, one should, according to the general trend, expect several private companies to be present in the country. Again, however, as only three private companies are present it appears that Saudi Arabia is functioning as least likely case.

Level-2 observations

Driven by their country's seemingly endless demand for energy, the Chinese state owned petroleum companies are frequently portrayed as following an aggressive expansion strategy (the Going Abroad Policy), supported by the government in Beijing (Lewis 2007: 18-48). Among the elements in this expansion strategy, the location of Chinese upstream FDI has received some attention, as the Chinese companies of China Petroleum National Corporation (CNPC), Sinopec and China National Offshore Oil Corporation (CNOOC) appear to have gained a solid foothold in perceived high-risk countries, such Sudan, Turkmenistan and Kazakhstan. Having, in turn, deleted the three Chinese petroleum companies from the sample, in model IP1, the removal of CNPC does lead to a stronger and now significant interaction effect (-0.167). Similarly, the estimated effect of democracy among the super majors becomes stronger (0.234).[39] The effects are also jointly significant. Moving on to model IP2, the exclusion of CNPC again produce stronger and more significant effects. Most notable is the interaction term, which is now significant at the 5% level. In model IP4, by removing CNPC from the sample, there is a remarked shift in strength and significance of the interaction term. Originally with a value of -0.336 and significant at the 10% level only, the value is now -0.600. The interaction is also significant at the 0.01% level. Finally, as CNPC is removed model IP5, the interaction term goes from being non-significant and with an effect of -0.285 to being almost most twice as strong and significant at the 5% level. For the other Chinese companies, the results did not change considerably having, in turn, excluded them from the analyses.

[39] The AIC is accordingly reduced to 1171.117, indicating substantially better fit.

The second group of companies to be excluded consists of Gazprom and British Gas (BG). Being predominately preoccupied with exploration and production of natural gas, these companies operate in a market, which in some important respects, differs from the oil market.[40] In model IP2, the exclusion of BG leads to a slightly stronger interaction effect, which is now also significant, albeit at the 10% level only. Furthermore, excluding BG from model IP4 does strengthen the interaction effect (-0.404). The interaction effect now also displays significance at the 5% level. Removing Gazprom from the sample does not alter the results in any particular way.

4.5 Robustness tests

To evaluate the robustness of the results provided in table 4.4 and 4.5 I apply several robustness tests. First, as the classification rule that separates larger from smaller multinational petroleum companies may greatly influence the results, in the fist robustness test, the smaller companies of Apache (295), Hess (301), Anadarko (302), Occidental (302), OMV (302), BG (306) and CNOOC (314) were separated from the other companies, together forming the group of smaller multinational petroleum companies.[41] Having refitted model IP1 to IP5, using the new classification rule, most of the interaction terms displayed remarked shifts in direction, with many of models now displaying results in accordance with the hypotheses formulated in chapter two. From these results then, it thus seems that the results displayed in table 4.4 are suffering from a lack of robustness, which stems from their sensitivity to how company size is operationalised.

Second, since multinational petroleum companies with 100% state ownership may not be subject to the same market scrutiny as companies with commercial shareholders, the ownership variable was respecified, now distinguishing multinational petroleum companies with 100% state ownership from companies, in which all or some of the shares are being commercially traded. The results from running model IS1 to IS5, using the new ownership variable, displayed only minor deviations from the findings reported in table 4.5. Based on these findings, it thus appears that the findings, reported in table 4.5, are not dependent on the classification rule that separates private from state owned companies.

[40] Since the commercial value of natural gas is lower than for oil, economic rents from gas are considerably lower than that from oil.
[41] PIW values in parentheses.

Third, a quick glance at the data shows that, with the exception of the Norwegian petroleum company Statoil, all petroleum companies from democratic home countries are classified as private according to 50% rule.[42] According to the same rule, none of the petroleum companies from authoritarian home countries are private. While strictly speaking a property of home countries and not the petroleum companies as such, to test whether the results in table 4.5 hold when the potentially confounding variable of the political regime in the home countries is taken into account, the ownership variable was substituted with a variable separating companies from democratic home countries from those that originate from authoritarian regimes. As expected, the results strongly indicated that companies from authoritarian regimes are less sensitive to political risk than companies from democracies. Based on these results, the more risk willingness of state owned petroleum companies may thus be explained by the differences between authoritarian home countries, which prefer state ownership to secure exclusive revenues and political control, and democratic home countries, in which better protection of private property and deregulations have produced a private market, on which private petroleum companies may flourish.

Fourth, while there may be some regional effects, such as religion and history, which have not been accounted for and that may lead to spatial autocorrelation, to test if the results in table 4.4 and 4.5 hold when different regions are, in turn, removed from the sample, the models were refitted, in turn excluding each of the following regions: 1) Sub Sahara Africa, 2) North Africa and the Middle East, 3) Latin America, 4) Former Soviet Union, and 5) Asia.[43] With a few exceptions, the results from these models yielded similar results as in those provided in table 4.4 and 4.5. The most notable among the expectations is the effect of the CCI when North Africa and the Middle East is removed, in which the effect becomes positive, albeit non-significant, for both larger and private companies. Furthermore, when the Latin American countries are excluded, the effect of HDI also becomes negative for both the super majors and for private petroleum companies. Considering the robustness of the findings in table 4.4 and 4.5 then, from these results, it thus appears to be increased support for the findings reported above, as testing for regional effects only generates minor deviance from the previous findings.

[42] Home countries classified as "Free" by Freedom House.
[43] As no region contains over 25% of the host countries, analysing each region separately would result in over fitted models. Thus, the regional effects are measures "negatively".

Fifth, according to Jaffe (2007: 12-17) there is evidence that suggests that national petroleum companies are crowding out the super majors. Not only competing with the super majors in foreign operations, in many oil producing countries, large and increasingly confident national petroleum companies, are more or less functioning as energy agencies, with which foreign petroleum companies have to negotiate. Based on these assumptions, I included a dummy variable, separating host countries, in which it is a large national petroleum company, from those where foreign companies are confronted with less organised domestic competition.[44] The results from refitting the models showed that the presence of national petroleum companies does not considerably alter the findings displayed in table 4.4 and 4.5.

Sixth, operating within an industry that is influenced by a cartel of producers, the investment allocation of multinational petroleum companies are likely to be influenced by the policies of the Organisation of the Petroleum Exporting Countries (OPEC). Encompassing twelve of the countries in the sample, OPEC has, from its beginning in the 1960s, played a key role in forming the petroleum policy of its member states, most notably as an arena for negotiations and information sharing, and as a framework of decision making and monitoring (Claes 2001: 131-171). Confronted with new market conditions, scholars, such as Claes (2001), has, however, raised questions about the rational for coordinating petroleum policies of producers with a highly diverse set of interests. As it turns out, one of the rationales behind continued cooperation is to balance the interest of major producers against the interests of other important market actors, such as multinational petroleum companies and consumers (ibid.: 91). Based on the abovementioned considerations, to test whether results, depicted in table 4.4 and 4.5, are influenced by OPEC policies towards the multinational petroleum companies, the twelve member countries were thus removed from sample. While leading to somewhat weaker effects, the new results predominately reproduced the results shown table 4.4 and 4.5, further corroborating to the robustness of the main findings.

4.6 Summary of findings

The two analyses conducted in this thesis have both generated some interesting, though at times, contradicting results. As seen in table 4.8, hypotheses 1a to 5a are all weakened by the findings, as the largest petroleum companies, here denoted as the super majors, appear to be

[44] Since the new variable also includes instances where the multinational petroleum companies are also the national petroleum company this variable is likely to be highly significant. The selection of countries are based on the whether they have companies at the PIW top 50 ranking and that they hold shares in the company.

more sensitive to political risk than the rest of the companies included in the analysis. These results are, however, associated with considerable uncertainty with robustness tests having shown that the smallest companies are generally more sensitive than the rest. For hypotheses 1b to 5b, the results are somewhat encouraging, as they generally seem to conform to expectations.

Table 4.8 Summary of findings

Hypothesis	Support
1a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of democracy.	Weaker (Contingent)
1b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower degree of democracy.	Stronger
2a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a higher degree of political instability and likelihood of civil war.	Weaker (Contingent)
2b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with higher levels of political instability and likelihood of civil war.	Stronger
3a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of human development and a higher degree of poverty.	Weaker (Contingent)
3b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower level degree of human development and a higher degree of poverty.	Stronger (Contingent)
4a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a lower degree of regulatory quality.	Weaker
4b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a lower degree of regulatory quality.	Stronger
5a: Larger multinational petroleum companies are more likely than smaller multinational petroleum companies to be present with upstream FDI in countries with a higher degree of corruption.	Weaker (Contingent)
5b: State owned multinational petroleum companies are more likely than private multinational petroleum companies to be present with upstream FDI in countries with a higher degree of corruption.	Stronger (Contingent)

5 Explanations and implications

Having described and evaluated the results from the analyses in chapter four, in this chapter, the results are subjected to a more thorough discussion, in which theoretical considerations are applied in the effort to explain the results. Furthermore, as science should be an accumulative undertaking, I will also discuss theoretical and methodological implications of this thesis. Here, the focus is on how the thesis may contribute to the research on the determinants of FDI and why the application of multilevel modelling should become more prominent within the field of political economy.

5.1 Explanation 1: Why bigger is not always better

In the first analysis, the aim was to analyse whether company size could modify the effect of political risk. The basic assumption in this analysis was that larger petroleum companies should be more likely to invest in host countries with a higher degree of perceived political risk, due to their superior O-specific advantages. Contrary to this assumption, the results from the formal analysis indicated that the super majors are more sensitive to political risk than the rest of the petroleum companies, when deciding where to allocate upstream FDI. However, as suggested by the robustness tests, when the smallest companies are compared to the other companies, there is a change of direction, providing results that are in accordance with hypotheses 1a to 5a. Based on these results, the relationship between company size and sensitivity to political risk could be described as a U-shaped curve, where, at the beginning, the sensitivity to political risk decreases with larger company size. Having reached a certain threshold, however, the sensitivity to political risk starts to rise again.

To explain why the world's largest petroleum companies should be less sensitive to political risk when deciding where to allocate their upstream FDI, the analyses have so far applied a *capacity perspective*. Here, larger companies, privileged with more capital, better negotiation power and with better access to the means necessary to protect production facilities and employees, are assumed to be equipped with better risk mitigation capacity than their smaller competitors. Although it is too early to write off the capacity perspective, in light of the results provided in the previous chapter, three other perspectives may offer some alternative explanations of why the super majors are seemingly so risk averse.

5.1.1 The industrial organisation perspective

According to the industrial organisation perspective, recent developments within the international petroleum industry have been more unfavourable to the super majors than to their smaller competitors. First of all, as many of the largest producers of petroleum resources have grown more mature, they are seeking to regain their control over reserves and production, which were lost during in the 1950s and the 1960s. As mentioned earlier, one of the most important elements in this development has been the growth of national petroleum companies, which as of 2007 controlled nearly 80% of the global reserves (Jaffe 2007: 36). Leading to less oil and gas being available to multinational petroleum companies, there are reasons to believe that the super majors are suffering the most from this development, as they have a competitive advantage in the development of larger fields (ibid.: 36).

Related to the first argument, as there have been important changes in the legal framework that regulates transactions within the extractive industries, today, multinational petroleum companies are operating within an international petroleum market, where traditional concessions have been replaced by more partnership oriented contracts, such as production sharing agreements and joint ventures (Moran 2009: 1-42). An important implication of this change in the governance of petroleum resources is that the equity shares, available to multinational petroleum companies, are becoming smaller. As larger petroleum companies, in general, and the super majors in particular, are dependent on projects that meet their higher materiality demands, these companies may become less willing to engage in risky upstream ventures, as the potential payoffs do not justify being exposed to higher levels of political risk.

The third and final element in the industrial organisation perspective concerns the on going outsourcing of different stages of the production chain within the petroleum industry (Stabell 2006: 94). Although predominately confined to other parts of the production chain than those encompassing upstream activity, recently, there has been a trend towards more exploration and production activities being conducted by specialised service companies. With regard to the results from the first analysis, the rise of an independent service companies should, first and foremost, curtail the geographical expansion of the super majors. The reason for this is that similar to the super majors, the service companies are usually equipped with state of the art technology, which makes these companies attractive to producer countries. All things equal, this should lead to a reduced likelihood that the super majors are present in countries

with a high level of perceived political risk. Furthermore, as even the super majors are buying the services of service companies, the super majors may, in fact, be indirectly exposed to political risk through the operations of the service companies. These operations are, however, not covered by the analyses conducted in this thesis.

5.1.2 The international relations perspective

Just as market conditions may offer an explanation for why larger petroleum companies appear to be less willing to invest in countries with higher levels of political risk, in accordance with the international relations perspective, foreign policy considerations of major producer and consumer countries are likely to influence the geographical allocation of upstream FDI of multinational petroleum companies. There are at least two reasons why the effect of foreign policies should be particularly pronounced for the super majors. First of all, as a majority of the super majors originate from the U.S., American foreign policies and geopolitical considerations may play an important role in limiting the allocation freedom of the super majors. For example, following amendments of the Iran Sanction Act (ISA), in 2010, U.S. President Barack Obama signed into law the Comprehensive Iran Sanctions, Accountability and Divestment Act (CISADA), which increases the scope of sanctions directed against persons and companies "making an investment that directly and significantly contributes to the enhancement of Iran's ability to develop its petroleum resources" (U.S. Department of State 2011). Rendering Iran an unviable destination for upstream FDI by U.S. based companies, the political actions taken against Iran, the country with the world's second largest proved oil reserves, provides an example of how geopolitical consideration can influence the geographical allocation of upstream FDI, thereby contributing to the findings in the first analysis.[45]

Besides American foreign policy, energy security considerations of emerging economies may explain why the super majors appear to be more sensitive to political risk when compared to the somewhat smaller companies. Defined by Yergin (1988: 111), as the objective "to assure adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives", an important implication is that governments in countries that experience rapid economic growth should have strong incentives to encourage increased foreign activity by their domestic companies. With the Asian state owned petroleum

[45] As of 2010, none of the U.S. based petroleum companies were present with upstream FDI in Iran.

companies serving as the most frequently used examples of how governments concerns over energy security may lead petroleum companies to invest in countries with higher levels of political risk, these companies, of which most are classified as small, are assumed to be important actors in a political strategy, which motivated by diversification of oil and gas supplies, involves political negotiations where the companies' access to foreign oil and gas deposits is being repaid in the form of construction and development of critical infrastructure.

5.1.3 The endogenous risk perspective

Pointing the finger at the petroleum companies themselves as an important source of political risk, the endogenous risk perspective builds on theories provided by the "resources curse" literature. According to these theories, countries with substantial natural resources tend to suffer from lower levels of economic and social development due to deteriorating competiveness of tradable industries and the degradation of political institutions (Ross 1999: 297-322; Sachs and Warner 2001: 827- 838). If correct, one possible implication of these theories would be that the presence of multinational petroleum companies, in general, and the super majors in particular, may contribute to increasing levels of political risk, as petroleum companies are key players in the realisation of petroleum rents. Furthermore, as suggested by Collier and Hoeffler (2005: 630-631), oil, and perhaps to a somewhat lesser degree, gas, are important ingredients in civil war, as these are commodities that are highly suitable as loots. Finally, as extraction of oil and gas may give rise to environmental and social externalities, conflicts between multinational petroleum companies and local communities are likely to occur. Although measures to create local content, such as CSR strategies, may reduce the economic and social impact of exploration and production, there are reasons to believe that environmental and social degradation would increase the propensity of indigenous people, and members of local communities, to engage in criminal activity targeting production facilities and employees of multinational petroleum companies. Following from this, larger companies may indeed be more sensitive to political risk, as being bigger also means being more exposed to the potentially destructive reactions from affected third parties.

5.2 Explanation 2: Authoritarian ownership

While analyses of the risk-moderating effect of company size did provide negative or somewhat contradicting results, the results from analysing interactions between state

ownership and political risk did show that state owned petroleum companies, in some important respects, are less sensitive to political risk than private petroleum companies when making decisions about the geographical allocation of upstream FDI. As revealed by the robustness tests, however, these results are just as likely to be caused by the fact that almost all state owned companies are also "authoritarian owned" companies. Based on this I will shortly debate how authoritarian ownership may influence the risk willingness of multinational petroleum companies.

Stating the almost obvious, there are good reasons to believe that companies from authoritarian regimes are not subjected to the same political pressure to stay away from countries, in which the citizens are deprived from basic democratic rights, and where there are widespread poverty and corruption. Moreover, as these home countries do not have a functioning oppositions and reliable sources of information, such as a free press, citizens and civil society groups, who would otherwise have played an important role in monitoring the operations of the state owned company, are deprived of valuable information about the business conduct of state owned petroleum companies. As a majority of the host countries, considered in these analyses, are themselves authoritarian, it is therefore a considerable potential for inter-autocracy trading, of which one important implication is that state owned companies from authoritarian regimes may enjoy a particular O-specific advantage in the form of reduced institutional and cultural distance (CD). According to Shenkar (2001: 520), the concept of cultural distance has been widely used to explain where and how FDI is undertaken. Most commonly it is assumed that smaller cultural distances encourage FDI, as the uncertainty that usually accompanies foreign ventures is more limited when investing in countries with more similar institutions and culture (Kogut and Singh 1988: 413-414). Given that 1) authoritarianism is capable of influencing political and social institutions and organisational cultures, and 2) that authoritarian regimes share a higher level of institutional and cultural similarity when compared to democracies, this may explain why authoritarian owned petroleum companies are more likely to invest in countries with higher degrees of perceived political risk.

By application of principal-agent theories Hartley and Medlock III (2007: 1-59) argue that managers of fully state owned petroleum companies do enjoy considerable discretionary power, since they are not subjected to the same scrutiny from the market as managers of publicly traded companies. As these managers are usually assumed to be following short-term

objectives, such as the rapid expansion of the corporation, in the long run, however, state owned petroleum companies generally achieve lower returns than their private competitors (Noreng 2006: 124). Authoritarian owners may have other incentives than to maximise long-term revenues from foreign investments. Since the power of authoritarian rulers is not grounded in popular support, they must find other ways to legitimise their reign. One way of achieving this is to buy off influential societal groups, which would otherwise join the opposition (Ross 2011: 3-4). Other measures to sustain political support involve the hiring of workers, loyal to the regime, by the state owned company (Biglaiser and Danis 2002: 85). Based on this, authoritarian owners may therefore perceive exclusive, albeit short-term revenues, as justifying the somewhat lower long-term returns, which, all things equal, should lead to less sensitivity to political risk (Hartley and Medlock III 2007: 13-14).[46]

Although several producers have joined the Extractive Industries Transparency Initiative (EITI), none of the owners of the state owned multinational petroleum companies considered in this, have agreed to regularly publicise "all material [on] oil, gas and mining payments by companies to governments ("payments") and all material revenues received by governments from oil, gas and mining companies ("revenues")" (EITI 2011). By not complying with the principles and criteria of the EITI, the operation of most state owned multinational petroleum companies are therefore not subjected to regular scrutiny. This should make state owned companies more likely to engage in upstream activities in countries with a higher degree of perceived political risk, as unethical business conduct, such as corruption, is unlikelier to cause punishment from competitors and international organisations.

5.3 Implication 1 (theoretical): Contingent and institutional O-specific advantages

Despite the fact that the eclectic OLI framework does not purport to be a testable theory, but "an analytical framework within which particular explanations of the determinants of MNE activity can be incorporated and appraised" (Dunning and Lundan 2008: 114), in this thesis I have made an effort to test one of the main tenets of the framework. Based on the assumption that larger petroleum companies are more likely to possess unique and sustainable O-specific

[46] There is a potentially contradicting mechanism in play when analysing the time perspective of authoritarian rulers. While authoritarian governments, in fear of getting overthrown in the near future, may favour short-term profits it is also possible to argue that they are not so dependent on short-term profits, as they are not responsible to the people. Here it is, however, assumed that the former type of consideration dominates the latter.

advantages when compared to smaller companies, a major claim in this thesis was that larger petroleum companies should be more capable of mitigating political risk. This was believed to lead these companies to invest more in countries, in which there is a high degree of perceived political risk. Contrary to these assumptions, however, it turned out that the world's largest petroleum companies are less likely to commence exploration and production in high risk countries. How then, should these results be interpreted in light of the OLI framework?

5.3.1 Contingent O-specific advantages

To explain why company size appears to be an O-specific disadvantage when considering the willingness to being exposed to, and the ability to mitigate, political risk, I have mainly been concentrating on exogenous explanations, most notably market changes and the foreign policies of the world's great powers. In light of these explanations, the scope and the nature of O-specific advantages is thus portrayed as being contingent on changes in the "operating milieu" of multinational petroleum companies (Narula 2010: 42). While, in my opinion, the basic OLI does not sufficiently address the importance of exogenous factors, extensions of the framework do provide suggestions of how market changes and foreign policy may interfere with the functioning of O-specific advantages.

Responding to the same type of criticism, which was forwarded in the previous section, Dunning (2001: 178-179) presents a heuristic equation, which illustrates how exogenous factors may lead to changes in the nature and the scope of O-specific advantages. Expressed in terms changes in the OLI configuration, the equations goes as follow:

$$OLI_{t1} = f(OLI_{t0}\ S_{t-n}\ \Delta S_{t0 \rightarrow t1}\ \Delta EN_{ti}\ \rightarrow_{t1}\ \Delta EX_{t0 \rightarrow t1}),$$

where OLI_{t0} is the configuration of the OLI advantages in the previous period, S_{t-n} the strategy pursued up to $_{to}$ and which is still be worked out, $\Delta S_{t0 \rightarrow t1}$ the strategic changes in the OLI configuration between $_{t0}$ and $_{t1}$, and $\Delta EN_{ti \rightarrow t1}$ and $\Delta EX_{t0 \rightarrow t1}$ the changes in the endogenous and exogenous environment of the company.

From the equation, it seems that exogenous factor, such as market changes and political constraints can be incorporated into the OLI framework, thereby taking into account the contingency of O-specific advantages. As such, the extended OLI framework is able to provide suggestions of how multinational petroleum companies will respond to political risk

under changing market conditions and politically induced constraints. On the other hand, despite being able to incorporate exogenous factors, the OLI framework does seem to overestimate multinational companies' ability to smoothly adapt to fundamental changes in their political and economic environment. Potentially turning an earlier advantage into a disadvantage, this may explain why the super majors are currently unable to exploit their other O-specific advantages, thereby contributing to the allocation of upstream FDI discovered in the previous chapter.

5.3.2 Institutional O-specific advantages

Complementing explanations provided by the capacity perspective, in chapter four an additional explanation for why state owned petroleum companies appear to be less sensitive to political risk was that they are predominately subjected to authoritarian ownership. As a consequence, it was proposed that state owned petroleum companies enjoy a particular O-specific advantages in the form of "institutional compatibility" when they invest in countries with a high degree of political risk. Furthermore, it was claimed that authoritarian owners have shorter time horizons, making state owned petroleum companies more willing to be exposed to political risk. While the basic OLI framework is unable to account for these types of O-specific advantages, by separating O-specific advantage between property rights and/or intangible asset advantages (Oa), and institutional assets (Oi), extended versions of the OLI framework do provide plausible explanations for why state owned petroleum companies invest more in countries with a higher degree of political risk (Dunning and Lundan 2008: 132-133).

Given that institutions are defined in a broad sense, both formal and informal institutions are important explanations for why state owned companies invest more in host countries where there is a high degree of political risk (Dunning and Lundan 2008: 129-131). Considering the impact of formal institutions first, authoritarian owned petroleum companies are likely to 1) "enjoy" regulations that do not prohibit engagement in investment projects with negative humanitarian and environmental consequences, 2) an organisation structure based on authoritarian principles, in which workers are deprived of influence, and 3) a reward system which encourages risk taking behaviour. Similarly, the informal institutions are likely to contribute to institutional compatibility through 1) a corporate culture characterised by a

strong focus on the ends and 2) a management with beliefs, similar to those of governments of countries characterised by underdevelopment and poor functioning institutions.

To summarise the theoretical implications of the analyses conducted in this thesis, it appears that the extended OLI framework is able to provide explanations for why the super majors, contrary to the hypotheses presented in chapter two, are less likely to be present in countries with a high degree of political risk. By dividing O-specific advantages into Oa and Oi advantages, the OLI framework does also provide explanations for why authoritarian owned petroleum companies are more likely than private petroleum companies to be found investing in the same countries. The proposed explanations do, however, emphasis the importance of other kinds of O-specific advantages than those put forward in the basic OLI framework, where traditional O-specific advantages, such as capital and technology are given predominance.

5.4 Implication 2 (methodological): The application of multilevel modelling in international political economy

In this thesis I have applied multilevel modelling in my effort to analyse how O-specific advantages interact with sources of political risk to explain the geographical allocation of upstream FDI. As I do not intend to make a contribution to the debate over quantitative versus qualitative methods, I will start by saying that my choice of method was not and is not based on some conviction about the supremacy of quantitative methods. With this in mind, however, as the application of multilevel modelling, for reasons mentioned below, allows for more complexity and realism to be introduced into quantitative models, the application of multilevel modelling may indeed remedy some of most commonly noted weaknesses of quantitative methods, thereby providing scholars within the field of international political economy with an additional, and if taken full advantage of, sophisticated analytical tool.

5.4.1 Structured data in international political economy

Multilevel data structures are not uncommon in international political economy. Companies may be nested within countries or regions, countries may be nested within organisations, individuals may be nested within companies, and companies may be nested within industries.

Despite the multilevel nature of many of the phenomena studied in international political economy, however, "throughout much of the history of the health and social sciences, investigators have tended to use analytic tools that could not handle these types of multilevel data and theories" (Luke 2004: 2). In this thesis, the application of multilevel modelling was first and foremost motivated by the assumption that that host countries (level 1) could be regarded as nested within the investment portfolio of multinational petroleum companies (level 2). Furthermore, the geographical allocation of upstream FDI was assumed to be result of the cross level interaction between the O-specific advantages of multinational petroleum companies, and the perceived level of political risk in host countries.

To explain how O-specific advantages interact with political risk, the OLI framework was used as theoretical point of departure. Now, being an eclectic framework, which incorporates insights from several different theories, the OLI framework seeks to explain the internationalisation of production by focusing on properties of both companies and countries. In doing so, however, the framework implicitly assumes a multilevel data structure, where companies and countries interact across different analytical levels. This brings us to the focal point in this discussion, which is that many theories within international political economy do assume some kind of multilevel data structure. If these theories are to be tested with quantitative methods, scholars should therefore, at least, consider multilevel modelling, as this will yield more valid explanations of the outcome of interest, while also reducing the risk of making ecological fallacies.

5.4.2 Too few higher level cases?

An important limitation in this thesis has been the relatively few multinational petroleum companies for which there exists accessible and comparable information. Given that "the sample size at the highest level is the main limiting characteristic of the [multilevel] design", the small number of multinational petroleum companies covered by this thesis, may thus render the multilevel model less effective (Snijders 2005: 2). Problems, such as the one encountered in this thesis, are likely to be particularly persuasive within the field of international political economy, where the number of typical higher level observations, such as countries, industries or regions, are restricted by the size of the population. To remedy the problem, a common strategy is therefore to include the temporal dimension, which through repeated measures of higher level observations, could increase the number of higher level

observations considerably. Unfortunately, this strategy is too often hampered by incomplete and unreliable data, which seems to be endemic to the field of international political economy.

6 Conclusion

In this thesis I sought to make some further contributions to the understanding of how political risk influences the geographical allocation of upstream foreign direct investments within the petroleum industry. As the theoretical point of departure I applied Dunning's eclectic OLI framework, from which ownership specific advantages were conceptualised along the lines of company size and state ownership. Complementing these theories, to explain how political risk is generated and how this affects foreign investors, I used several different theories. Providing suggestions about the effect of political regime, political instability, human development and poverty, and regulatory quality and corruption, based on these theories I then formulated hypotheses, which were analysed using logistic multilevel modelling. In these models the focal point was to test whether company size and state ownership can moderate the effect of political risk. This was achieved by including cross level interaction terms. The analyses did yield some interesting results. First, contrary to the assumption made in formulating hypotheses 1a to 5a, the results from the first analysis showed that the world's largest petroleum companies are less likely than their smaller counterparts to be present with upstream FDI in host countries where there is a high degree of perceived political risk. Submitted to robustness test, these results proved robust against several alterations of the sample. However, the same robustness test also revealed that the results are likely to be dependent on how company size is operationalised, with the smallest multinational petroleum companies turning out as more sensitive to political risk than the rest.

Second, conforming to the expectations expressed in hypotheses 1b to 5b, state ownership seems to increase the likelihood that multinational petroleum companies are present in host countries with a higher degree of perceived political risk. Similar to the findings from the first analysis, these results appeared to be robust confronted with altered samples. When controlled for home country political regime, a clear pattern nevertheless emerged, with all state owned companies, except Statoil, originating from authoritarian regimes. The potential effect of this omitted variable was debated in some detail in chapter four, in which the basic argument was that authoritarian owned companies enjoy a competitive advantage when it comes to investments in countries where there is a higher degree of political risk.

What then do these findings mean? First and foremost, although some of the results did contradict expectations, the results indicate that there are some important differences between,

on one hand, smaller and larger companies and, on the other hand, state owned and private companies with regard to how these companies evaluate the significance of political risk in current and prospective host countries. Moreover, as discussed extensively in the previous chapter, while traditional ownership specific advantages, such as capital and technology, may still influence the capability to mitigate political risk, factors, external to multinational petroleum companies, are likely to play an equally important role in determining the geographical allocation of upstream FDI. Among the most important of these factors are changes in the organisation of the petroleum market, foreign policies of major consumer (and producer) countries and the political regime in the home countries. As such, the effect of political risk on the geographical allocation of upstream FDI must be understood and interpreted within an industrial and political context, where changing conditions, at times, may render some multinational petroleum companies more capable of and more willing to invest in countries with a higher degree of perceived political risk. This is why O-specific advantages are contingent.

Considering the methodological implications of thesis, having chosen a quantitative approach, I was able to analyse several of the key actors within the petroleum industry. The application of multilevel modelling further allowed me to analyse structured data in a rigorous manner, with the inclusion of cross level interaction terms providing an effective means to test the significance of the moderating effect of company size and state ownership. On the other hand, as indicated by the discussion in the previous chapter, the relatively low number of higher level observations does represent an important limitation with regard to the external validity of the results provided by this thesis. In a similar fashion, the inability to incorporate the temporal dimension means that generalisations should be done with caution, as variables that changes over time, such as the price of oil and gas, are not captured by this thesis. As proved by the recent events in North Africa and the Middle East, political risk is likely to continue to influence the operations of multinational petroleum companies in the foreseeable future. Provided with better data, analyses such as the ones conducted in this thesis could offer some important suggestions of how these events come about and how civil unrest and opportunism on behalf of host country governments influences the geographical allocation of upstream FDI. To get a complete picture, these methods should, however, be complemented with in-depth studies, of which one of the most important contributions would be more valid measurements of political risk and of the factors determining the risk mitigation capacity of multinational companies.

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Appendix A: Companies and countries in the analyses

Companies

Name	Nationality	PIW	% state owned
Exxon Mobil	U.S.	37	0
CNPC	China	53	100
BP	U.K	55	0
Shell	The Netherlands	65	0
ConocoPhillips	U.S.	87	0
Chevron	U.S.	90	0
Total	France	90	0
KPC	Kuwait	101	100
Sonatrach	Algeria	103	100
Gazprom	Russia	109	50.0023
Petrobras	Brazil	113	32.2
Lukoil	Russia	127	0
Petronas	Malaysia	129	100
Eni	Italy	141	30
Sinopec	China	173	75.84
Statoil	Norway	184	65
Repsol	Spain	188	0
ONGC	India	228	74.14
Marathon	U.S.	236	0
Apache	U.S.	295	0
Hess	U.S.	301	0
Anardarko	U.S.	302	0
Occidental	U.S.	302	0
OMV	Austria	302	30.5
BG	U.K.	306	0
CNOOC	China	314	66.41

Countries

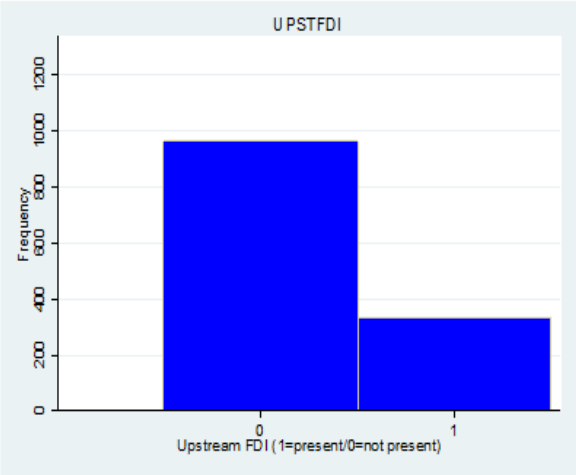
Algeria	Mexico
Angola	Myanmar
Argentina	Nigeria
Azerbaijan	Oman
Bangladesh	Pakistan
Bolivia	Peru
Brazil	Phillipenes
Brunei	Qatar
Cameroon	Rep.Congo
Chad	Russia
China	Saudi Arabia
Colombia	Sudan
Cuba	Syria
Ecuador	Tanzania
Egypt	Thailand
Eq.Guinea	Trinidad and Tobago
Gabon	Tunisia
India	Turkmenistan
Indonesia	UAE
Iran	Uzbekistan
Iraq	Venezuela
Ivory Coast	Vietnam
Kazahkstan	Yemen
Kuwait	
Libya	
Malaysia	
Mauretania	

Appendix B: The sample in numbers

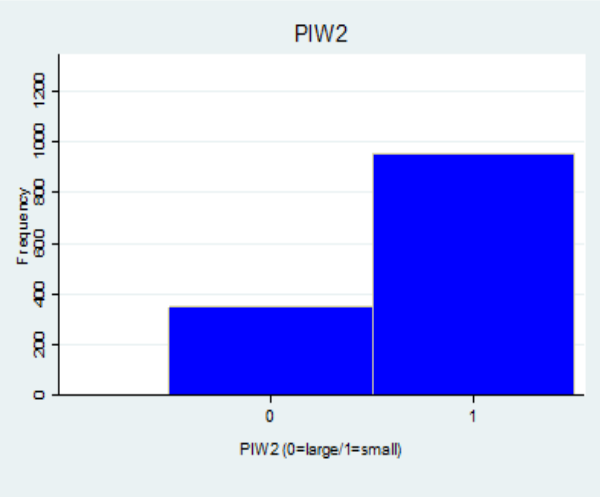
Countries	
Oil exporting countries, world	91
Oil exporting countries, non OECD	65
Oil exporting countries, sample	50
Coverage, world	0.55
Coverage, non OECD	0.77
Reserves, oil (bbl)	
Reserves, world	1 317 447 415.00
Reserves, non OECD	1 098 043 230.00
Reserves, sample	1 087 341 040.00
Coverage, world	0.83
Coverage, non OECD	0.99
Reserves, gas (bcf)	
Reserves, world	6 128 212.00
Reserves, non OECD	5 703 627.00
Reserves, sample	4 650 114.00
Coverage, world	0.92
Coverage, non OECD	0.99

Appendix C: Descriptive statistics

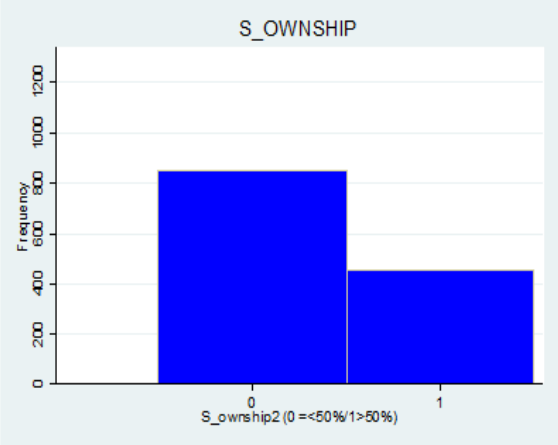
Dependent variable: presence of upstream FDI



Company size: PIW2



State ownership: S_ownship2



Risk and control variables

Variable	Obs	Mean	Std. Dev	Min	Max
fhi_rev	1300	3.05	1.5441	1	6
psi	1300	-0.6882	0.9273	-2.81	1.21
hdi	1274	-0.7271	0.1327	0.392	0.92
rqi	1300	-0.5322	0.7567	-2.25	1
cci	1300	-0.5848	0.6142	-1.63	1.03
ln_poilres	1274	1.0097	2.3561	-4.4428	5.5599
ln_pgasres	1248	3.0144	1.9577	-1.4696	7.4265
ln_inflation	1248	1.7528	0.7630	0	3.6243
in_population	1300	3.0743	1.7343	-0.9571	7.1837
wto	1300	0.74	0.4388	0	1

Appendix D: Correlations in preliminary analysis

	ln_poilres	ln_pgasres	ln_inflation	ln_population	wto	fhi_rev	psi	hdi	rqi	cci
ln_poilres	1.0000									
ln_pgasres	0.7000	1.0000								
ln_inflation	0.1485	0.2683	1.0000							
ln_population	0.1161	0.1901	0.0603	1.0000						
wto	-0.1453	-0.2429	-0.4260	0.0958	1.0000					
fhi_rev	0.0272	-0.0495	-0.1594	0.2140	0.4828	1.0000				
psi	0.2252	0.1374	-0.2085	-0.5556	0.0929	-0.0204	1.0000			
hdi	0.4771	0.4661	-0.1342	-0.2835	0.0013	0.2075	0.6666	1.0000		
rqi	0.2081	0.0883	-0.5357	-0.1274	0.4567	0.4251	0.4627	0.5197	1.0000	
cci	0.3757	0.3509	-0.3524	-0.1990	0.4044	0.3348	0.5335	0.6391	0.8169	1.0000

Appendix E: VIF values with centered PIW2 and S_ownship2

VIF values in model IP1-IP5

	Model IP1	Model IP2	Model IP3	Model IP4	Model IP5
fhi_rev	1.80				
psi		2.79			
hdi			1.80		
rqi				4.44	
cci					5.25
piw2	1.00	1.00	1.00	1.00	1.00
piw2_fhi	1.00				
piw2_psi		1.00			
piw2_hdi			1.00		1.00
piw2_rqi				1.01	
piw2_cci					1.00

VIF values in model IS1-IS5

	Model IS1	Model IS2	Model IS3	Model IS4	Model IS5
fhi_rev	1.80				
psi		2.79			
hdi			3.32		
rqi				4.46	
cci					5.26
s_ownship2	1.00	1.00	1.00	1.00	1.00
s_ownship2_fhi	1.00				
s_ownship2_psi		1.00			
s_ownship2_hdi			1.00		
s_ownship2_rqi				1.01	
s_ownship2_cci					1.00

Appendix F: Summary of influential observations

Level-1 observations

Model	Country	Risk coeff.	Int. term	Joint sig.
IP2	Libya	0.413**	-0.325*	0.0002
	Colombia	0.634***	-0.316*	0.0000
IP3	Nigeria	2.930**	-2.892**	0.0002
IP4	Libya	0.585**	-0.321	0.0001
	Colombia	0.524**	-0.315	0.0003
IP5	Russia	-0.817***	-0.306	0.0000
	Colombia	-0.640**	-0.262	0.0000

* p < 0.10 ** p < 0.05 *** p < 0.01

Model	Country	Risk coeff.	Int. term	Joint sig.
IS3	Nigeria	2.941**	4.789***	0.0012
	Saudi Arabia	1.789*	-4.181***	0.0043
IS5	Russia	-0.689**	-1.087***	0.0000
	Algeria	-0.569**	-1.111***	0.0000
	Colombia	-0.484*	-1.061***	0.0000
	Saudi Arabia	-0.462*	-1.038***	0.0000

* p < 0.10 ** p < 0.05 *** p < 0.01

Level-2 observations

Model	Company	Risk coeff.	Int. eff.	Joint sig.
IP1	CNPC	0.234**	-0.167*	0.0007
IP2	CNPC	0.580***	-0.381**	0.0001
	BG	0.444**	-0.313*	0.0002
IP4	CNPC	0.846***	-0.600***	0.0000
	BG	0.582**	-0.404**	0.0002
IP5	CNPC	-0.378	-0.547**	0.0000

* p < 0.10 ** p < 0.05 *** p < 0.01

Appendix G: Do-files and dataset (CD)